

No.

200500305

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Cereal Research Centre - Agriculture and Agri-Food Canada

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF Viable BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE STANDARDS OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'HY644'

In Testimony Whereof, I have hereunto set my hand
and caused the seal of the Plant Variety
Protection Office to be affixed at the City of
Washington, D.C. this fifth day of July, in the
year two thousand and six.

Atest:


Commissioner
Plant Variety Protection Office
Agricultural Marketing Service


Secretary of Agriculture

REPRODUCE LOCALLY. Include form number and date on all reproductions.

Form Approved - GMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY- PLANT VARIETY PROTECTION OFFICE
APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and Information Collected by the Owner Statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

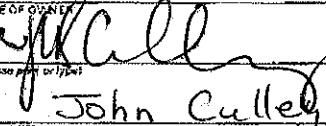
1. NAME OF OWNER Cereal Research Centre - Agriculture & Agri-Food Canada		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME HY644	3. VARIETY NAME HY644
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and County) 195 Dafoe Road Winnipeg, MB R3T 2M9		5. TELEPHONE (Include area code) (613) 759-7835	FOR OFFICIAL USE ONLY FILE NUMBER 200500305
6. FAX (Include area code) (613) 759-7770		FILING DATE July 28, 2005	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (Corporation, Partnership, Association, etc.) Branch of a Dept. of the Government of Canada		8. IF INCORPORATED, GIVE STATE OF INCORPORATION	9. DATE OF INCORPORATION
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION: (First person listed will receive all papers) Ronald B. Weik Quality Assured Seeds Inc. 41BB McDonald St. Regina, SK S4N 6E1			
FEE RECEIVED 10	FILING AND EXAMINATION FEES: \$ 3652.00 DATE 7/28/2005 CERTIFICATION FEES \$ 768.00 DATE 5/30/2006		

11. TELEPHONE (Include area code) (306) 791-0500	12. FAX (Include area code) (306) 791-0553	13. E-MAIL rweik@qas-online.com
14. CROP KIND (Common Name) Wheat	15. FAMILY NAME (Botanical) Triticum aestivum	16. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION.
17. GENUS AND SPECIES NAME OF CROP	18. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow Instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Status of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,052), made payable to "Treasurer of the United States" (not to the Plant Variety Protection Office)
20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) <input checked="" type="checkbox"/> YES (If "yes", answer items 21 and 22 below) <input type="checkbox"/> NO (If "no", go to Item 23)	21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input checked="" type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED	22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input checked="" type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional information is necessary, please use the space indicated on the reverse.)
23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	25. IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse)

The owner(s) declare that a viable sample of seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or that a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) declare the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER  John Culley	SIGNATURE OF OWNER
NAME (Please print or type) Director of Intellectual Property and Commercialization	NAME (Please print or type)
CAPACITY OR TITLE Director of Intellectual Property and Commercialization	DATE July 5, 2005
CAPACITY OR TITLE	DATE

(See reverse for instructions on information collection burden statement.)

INSTRUCTIONS**200500305**

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety, at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filing fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the *Regulations and Rules of Practice*.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. DO NOT use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvpindex.htm>

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 <http://www.ams.usda.gov/lsg/seed.htm>.

ITEM

- 19a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) evidence of uniformity and stability; and (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
 - (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
 - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
20. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See *Regulations and Rules of Practice*, Section 97.103).
23. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

22. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

Breeder to produce Foundation; Foundation to produce Registered; Registered to produce Certified. *The progeny of certified
may NOT be sold as unigreed seed.*

23. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)**24. CONTINUED FROM FRONT** (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

Pending in Canada. Canadian application filed April 20, 2000.

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the *Regulations and Rules of Practice*.)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD). USDA is an equal opportunity provider and employer.

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 328-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.



Exhibit A: Origin and Breeding History of HY644

HY644 was developed from the cross A 16//Alpha*4/BgBSR/3/Sceptre/Ning 8331 where:

- A 16 = Alpha 16 which is a pure line highly resistant to leaf rust reselected out of Alpha
- Alpha = HY612, and
- BgBSR = the cultivar Biggar to which bunt and smut resistance have been added by backcrossing.

The final cross was made at the Cereal Research Centre (CRC) of Agriculture and Agri-Food Canada located in Winnipeg, MB, Canada in 1992; 10 F1 seeds were increased in the growth cabinet. Eight F2 head rows were grown in the 1992-93 New Zealand nursery from which heads were selected. F3 were grown in the 1993 FHB nursery at Glenlea, MB, Canada. F4 head rows were increased in the 1993-94 New Zealand nursery and concurrently screened for FHB in the greenhouses at the CRC. F5 heads were screened in a FHB nursery at Glenlea, MB in 1994 and F6 head rows were increased in the 1994-95 New Zealand nursery. For the line that would ultimately be HY644, 375 grams of F7 seed was harvested in New Zealand; this seed was tested in the 1995 CPS Preliminary yield trial at Glenlea and Portage la Prairie, MB. F8 lines were tested in the 1996 EPW "A" trial grown at Glenlea & Portage la Prairie, MB and Lethbridge, AB, Canada. In 1997, two F9 lines were tested in the EPW "B" trial grown at eight locations in Western Canada. Based on yield and agronomic performance, disease resistance and grain quality, one line was selected to be tested in the 1998 and 1999 High Yield Wheat Co-op trial.

Breeder seed was derived from heads randomly selected from rogued 1998 increase plots. One hundred twenty-head rows were grown in isolation in the 1998-99 Palmerston North (New Zealand) nursery and increase plots grown at Indian Head in 1999.

Uniformity and Stability

HY644 has been observed in the 1998, 1999 and 2000 High Yield Wheat Co-operative Yield Trials and in pure seed increases associated with these Co-op trials. It was also observed in Plant Breeder's Rights trials in 2001 and 2003.

In all of these trials, HY644 was observed to be uniform and stable for plant morphological, agronomic and disease resistance characteristics. The seed shape of HY644 is typically the "CPS" shape, that is, elliptical with a small embryo; however, a low percentage, typically 2-5% of the kernels have an oval shape. The 2-5% of the kernels that have an oval shape are a genetic variant.

Exhibit B: Statement of Distinctness, HY644

The following is the Statement of Distinctiveness for HY644.

HY644 is most similar to the variety AC Crystal.

Basis a robust statistical analysis, the significant distinguishing characteristics of HY644 compared with AC Crystal (basis paired trials conducted in 2001 and 2003) are:

Flag leaf length

The length of the flag leaf of HY644 is, on average, 5.45 cm longer than AC Crystal. Summary of the statistical analysis for Flag leaf length follows:

	2001 HY644	2001 AC Crystal	2003 HY644	2003 AC Crystal
N	20	20	20	20
mean (cm)	17.26	13.04	23.76	17.06
diff (cm)		4.22		6.70
Std Dev	3.31	2.22	2.56	2.79
Std Err	0.741	0.496	0.572	0.624
t-value		4.74		7.91
Pr		0.0001		0.0001

Spike Length

The average spike length of HY644 is 0.81 cm longer than AC Crystal. Summary of the statistical analysis for spike length follows:

	2001 HY644	2001 AC Crystal	2003 HY644	2003 AC Crystal
N	11	11	20	20
mean (cm)	8.10	7.47	9.80	8.80
diff (cm)		0.63		0.99
Std Dev	0.70	0.41	0.49	0.39
Std Err	0.212	0.123	0.109	0.088
t-value		2.55		7.14
Pr		0.019		0.0001

Kernel Weight

The weight of 1000 kernels of HY644 is 7.40 grams greater than the weight of 1000 kernels of AC Crystal. Summary of the statistical analysis for kernel weight follows.

	2001	2001	2003	2003
9.6 Kernel Weight	HY644	AC Crystal	HY644	AC Crystal
N			4	4
mean (g/1000)			34.60	27.20
diff (g/1000)				7.40
Std Dev			0.84	0.46
Std Err			0.42	0.23
t-value				15.46
Pr				0.0001

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 2.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

**U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705**

Exhibit C

**OBJECTIVE DESCRIPTION OF VARIETY
Wheat (*Triticum* spp.)**

NAME OF APPLICANT (S)	TEMPORARY OR EXPERIMENTAL DESIGNATION	VARIETY NAME
Cereal Research Centre Winnipeg, MB.	HY644	HY644
ADDRESS (Street and No. or RD No., City, State, Zip Code and Country)		FOR OFFICIAL USE ONLY
195 Dafoe Road Winnipeg, MB. R3T 2M9		PVPO NUMBER
200500305		

PLEASE READ ALL INSTRUCTIONS CAREFULLY:

Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. 0 9 9 or 0 9) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____ . Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

- 1 = Common
 2 = Durum
 3 = Club
 4 = Other (Specify) _____

2. VERNALIZATION:

- 1 = Spring
 2 = Winter
 3 = Other (Specify) _____

3. COLEOPTILE ANTHOCYANIN:

- 1 = Absent 2 = Present

4. JUVENILE PLANT GROWTH:

- 1 = Prostrate 2 = Semi-erect 3 = Erect

5. PLANT COLOR: (boot stage)

- 1 = Yellow-Green
 2 = Green
 3 = Blue-Green

6. FLAG LEAF: (boot stage)

- 1 = Erect 2 = Recurved
 1 = Not Twisted 2 = Twisted
 2 = Wax Absent 2 = Wax Present

7. EAR EMERGENCE:

- 051 Number of Days (Average)
 Number of Days Earlier Than
 Same As
 01 Number of Days Later Than

- * N/A _____
* AC Crystal & AC Karma _____
* AC Vista _____
*Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

8. ANTER COLOR:

- 1 = Yellow 2 = Purple

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9. PLANT HEIGHT: (from soil to top of head, excluding awns)

 072

cm (Average)

 03

cm Taller Than

Same As

AC Vitta ; 02 cm. taller than AC Crystal

ACKarmer *

cm Shorter Than

N/A *

10. STEM:

A. ANTHOCYANIN

 1

1 = Absent 2 = Present

D. INTERNODE

 1

1 = Hollow

2 = Semi-solid

3 = Solid

Number of Nodes

(not counted)

B. WAXY BLOOM

 2

1 = Absent 2 = Present

E. PEDUNCLE

 1

1 = Erect

2 = Recurved

3 = Semi-erect

cm Length

(not measured)

C. HAIRINESS (last internode of rachis)

 1

1 = Absent 2 = Present

F. AURICLE

 1

Anthocyanin:

1 = Absent

2 = Present

 1

Hair:

1 = Absent

2 = Present

11. HEAD: (At Maturity)

A. DENSITY

 21 = Lax
2 = Middense (Laxidense)
3 = Dense

C. CURVATURE

 21 = Erect
2 = Inclined
3 = Recurved

B. SHAPE

 41 = Tapering
2 = Strap
3 = Clavate
4 = Other (Specify) Oblong

D. AWNEDNESS

 41 = Awnless
2 = Apically Awnletted
3 = Awnletted
4 = Awned

12. GLUMES: (At Maturity)

A. COLOR

 11 = White
2 = Tan
3 = Other (Specify) _____

E. BEAK WIDTH

 21 = Narrow
2 = Medium
3 = Wide

B. SHOULDER

 21 = Wanting 2 = Oblique
3 = Rounded 4 = Square
5 = Elevated 6 = Apiculate
7 = Other (Specify) _____

F. GLUME LENGTH

 21 = Short (ca. 7mm)
2 = Medium (ca. 8mm)
3 = Long (ca. 9mm)

C. SHOULDER WIDTH

 21 = Narrow
2 = Medium
3 = Wide

G. WIDTH

 21 = Narrow (ca. 3mm)
2 = Medium (ca. 3.5mm)
3 = Long (ca. 4mm)

D. BEAK

 21 = Obtuse
2 = Acute
3 = Acuminate

7

13. SEED:

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A. SHAPE

- 3 1 = Ovate
 2 = Oval
 3 = Elliptical

B. CHEEK

- 2 1 = Rounded
 2 = Angular

C. BRUSH

- 2 1 = Short 1 = Not Collared
 2 = Medium 2 = Collared
 3 = Long

D. CREASE

- 1 1 = Width 60% or less of Kernel
 2 = Width 80% or less of Kernel
 3 = Width Nearly as Wide as Kernel

- 2 1 = Depth 20% or less of Kernel
 2 = Depth 35% or less of Kernel
 3 = Depth 50% or less of Kernel

E. COLOR

- 3 1 = White
 2 = Amber
 3 = Red
 4 = Other (Specify) _____

F. TEXTURE

- 1 1 = Hard
 2 = Soft
 3 = Other (Specify) _____

G. PHENOL REACTION (See Instructions)

- 1 1 = Ivory 4 = Dark Brown
 2 = Fawn 5 = Black
 3 = Light Brown
- (not measured)*

H. SEED WEIGHT

- 35 g/1000 Seed (Whole number only)

I. GERM SIZE

- 1 1 = Small
 2 = Midsize
 3 = Large

14. DISEASE: PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

(0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

- | | |
|--|--|
| <input checked="" type="checkbox"/> 2 Stem Rust (<i>Puccinia graminis</i> f. sp. <i>tritici</i>) | <input checked="" type="checkbox"/> 3 Leaf Rust (<i>Puccinia recondita</i> f. sp. <i>tritici</i>) |
| <input type="checkbox"/> 0 Stripe Rust (<i>Puccinia striiformis</i>) | <input checked="" type="checkbox"/> 2 Loose Smut (<i>Ustilago tritici</i>) |
| <input type="checkbox"/> 0 Tan Spot (<i>Pyrenophora tritici-repentis</i>) | <input checked="" type="checkbox"/> 0 Flag Smut (<i>Urocystis agropyri</i>) |
| <input type="checkbox"/> 0 Halo Spot (<i>Selenophoma donacis</i>) | <input checked="" type="checkbox"/> 1 Common Bunt (<i>Tilletia tritici</i> or <i>T. laevis</i>) |
| <input checked="" type="checkbox"/> 1 Septoria nodorum (Glume Blotch) | <input checked="" type="checkbox"/> 0 Dwarf Bunt (<i>Tilletia controversa</i>) |
| <input type="checkbox"/> 0 Septoria avenae (Speckled Leaf Disease) | <input checked="" type="checkbox"/> 0 Karnal Bunt (<i>Tilletia indica</i>) |
| <input checked="" type="checkbox"/> 1 Septoria tritici (Speckled Leaf Blotch) | <input checked="" type="checkbox"/> 0 Powdery Mildew (<i>Erysiphe graminis</i> f. sp. <i>tritici</i>) |
| <input checked="" type="checkbox"/> 2 Scab (<i>Fusarium</i> spp.) | <input type="checkbox"/> 0 "Snow Molds" |
| <input type="checkbox"/> 0 "Black Point" (Kernel Smudge) | <input checked="" type="checkbox"/> 0 Common Root Rot (<i>Fusarium, Cochliobolus</i> and <i>Bipolaris</i> spp.) |
| <input type="checkbox"/> 0 Barley Yellow Dwarf Virus (BYDV) | <input checked="" type="checkbox"/> 0 Rhizoctonia Root Rot (<i>Rhizoctonia solani</i>) |
| <input type="checkbox"/> 0 Soilborne Mosaic Virus (SBMV) | <input checked="" type="checkbox"/> 0 Black Chaff (<i>Xanthomonas campestris</i> pv. <i>translucens</i>) |
| <input type="checkbox"/> 0 Wheat Yellow (Spindle Streak) Mosaic Virus | <input checked="" type="checkbox"/> 0 Bacterial Leaf Blight (<i>Pseudomonas syringae</i> pv. <i>syringae</i>) |
| <input checked="" type="checkbox"/> 0 Wheat Streak Mosaic Virus (WSMV) | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> Other (Specify) _____ | <input type="checkbox"/> Other (Specify) _____ |

15. INSECT: (0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

- | | |
|---|--|
| <input checked="" type="checkbox"/> 0 Hessian Fly (<i>Mayetiola destructor</i>) | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> 0 Stem Sawfly (<i>Cephus</i> spp.) | <input type="checkbox"/> Other (Specify) _____ |
| <input type="checkbox"/> 0 Cereal Leaf Beetle (<i>Oulema melanopa</i>) | <input type="checkbox"/> Other (Specify) _____ |

15. INSECT: (continued) 0 = Not Tested 1 = Susceptible 2 = Resistant 3 = Intermediate 4 = Tolerant

PLEASE SPECIFY BIOTYPE (Where Needed)

- Russian Aphid (*Diuraphis noxia*)
- Greenbug (*Schizaphis graminum*)
- Aphids

Other (Specify) _____
 Other (Specify) _____
 Other (Specify) _____

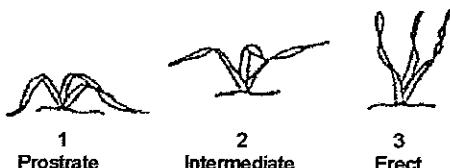
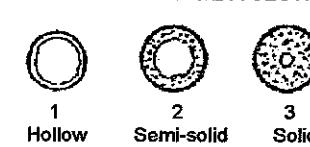
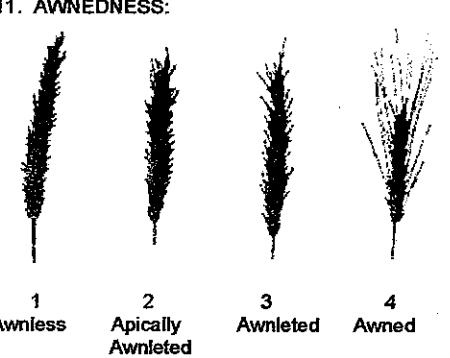
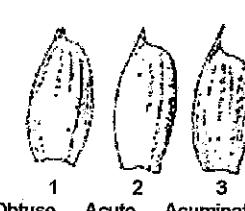
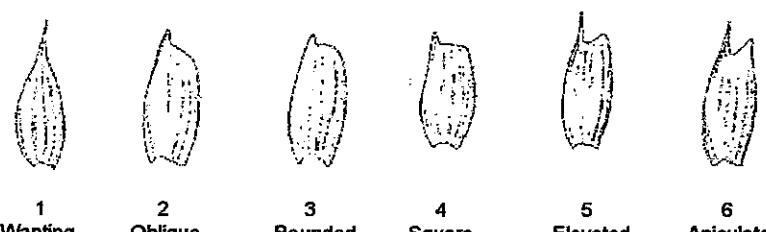
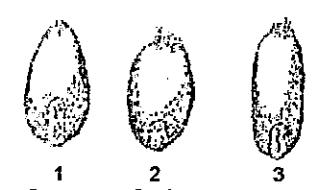
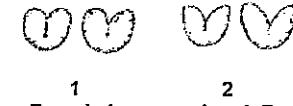
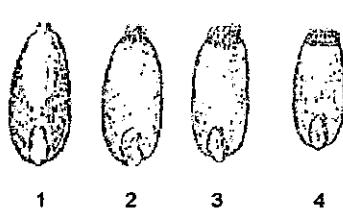
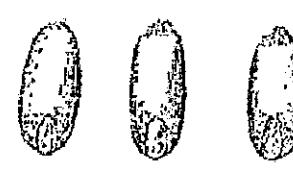
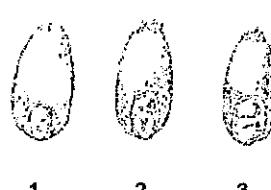
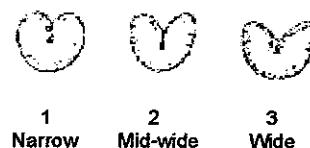
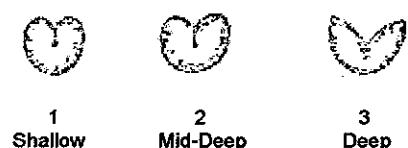
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16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

WHEAT DESCRIPTOR ILLUSTRATIONS

Section Numbers Correspond to the Numbers of the Sections on the Form

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4. EARLY PLANT GROWTH HABIT:			10. STEM INTERNODE X-SECTION:			11. SPIKE SHAPE:		
 1 Prostrate 2 Intermediate 3 Erect			 1 Hollow 2 Semi-solid 3 Solid			 1 Tapering 2 Oblong 3 Clavate 4 Elliptical		
11. AWNEDNESS:			12. BEAK SHAPE:			 1 Awnless 2 Apically awned 3 Awnleted 4 Awned		
			 1 Obtuse 2 Acute 3 Acuminate			 1 Wanting 2 Oblique 3 Rounded 4 Square 5 Elevated 6 Apiculate		
13. SEED SHAPE:	13. CHEEK SHAPE:	13. BRUSH SIZE:	13. BRUSH HAIR LENGTH:					
 1 Ovate 2 Oval 3 Elliptical	 1 Rounded 2 Angular	 1 Small 2 Midsized 3 Large 4 Collared	 1 Short 2 Medium 3 Long					
13. GERM (EMBRYO) SIZE:	13. SEED CREASE WIDTH:	13. SEED CREASE DEPTH:						
 1 Small 2 Midsized 3 Large	 1 Narrow 2 Mid-wide 3 Wide	 1 Shallow 2 Mid-Deep 3 Deep						

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Appendix D: Additional Description of the Variety

1. Report on the High Yielding Cooperative Test
2. Minutes, Disease Evaluation Team, February 2001
3. Letter of 'Names Cleared'

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(not for publication)
(ne publier pas)

**REPORT ON THE HIGH YIELDING
WHEAT CO-OPERATIVE TEST
2000**

**RAPPORT SUR LES ESSAIS CO-OPÉRATIFS
BLÉ A RENDEMENT ÉLÈVE
2000**

**Conducted by the
Prairie Registration Recommending
Committee for Grain**

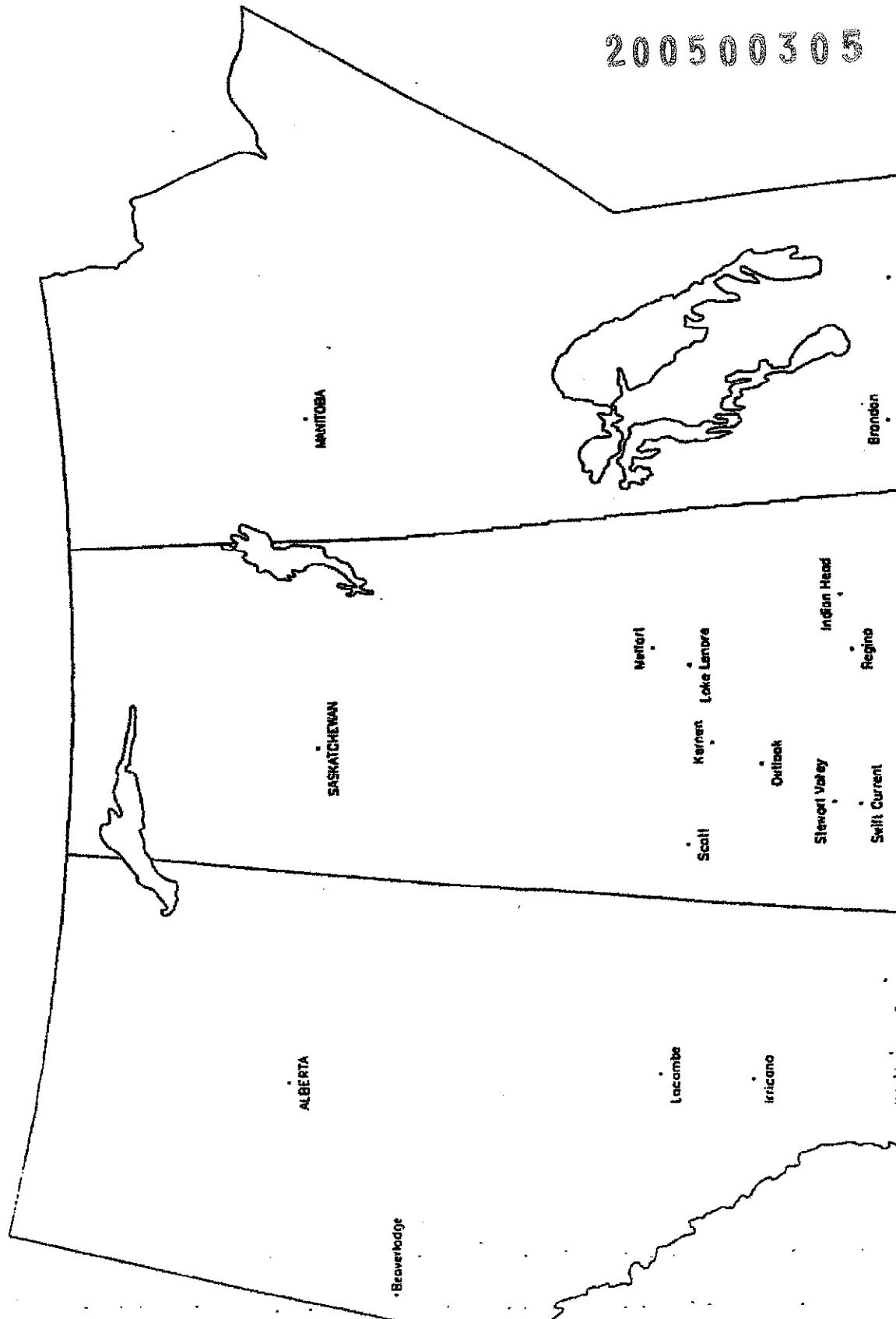
**Conduit par le Comité de recommandation
pour l'enregistrement des Céréales
dans la région des Prairies**

February 2001

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High Yield Wheat Co-op 2000

Test Sites in Western Canada



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High Yielding Wheat Co-op 2000 Description of Tests

The purpose of the High Yielding Wheat Co-operative test is to develop wheat cultivars with grain yield potential higher than Canada Western Red Spring cultivars, and that have end-use suitability factors acceptable for Canada Prairie Spring, or for experimental quality types whose market potential is unknown.

A uniform set of 25 entries was grown in a 5 X 5 lattice design with 3 replicates. The entries comprised 5 registered cultivars as standards [AC Barrie (CWR5), AC Karma and AC Vista (CPS-White), AC2000 (CPS-White), and AC Crystal (CPS-Red)] and 20 experimental lines (Table 2).

The HYWC' was grown at 19 locations in Western Canada... 5 sites in the Black soil zone, 6 sites in the Brown and Dark Brown soil zone, 4 sites in the northern Black and Grey wooded soil zone, and 4 irrigated sites in the Brown and Dark Brown soil zone (Table 1).

Spring soil moisture reserves were adequate at all locations to obtain uniform plant stands. All tests were seeded prior to mid-May except Glenlea, Kernen, Outlook and Bow Island (Table 15) and the irrigated test at Swift Current was discarded due to hail damage. The conditions for crop growth were generally favourable for the other sites. Fusarium Head Blight caused down-grading at Elgin, Rosebank, and Morden. The average kernel size of 35.7 mg for AC Crystal (Table 9) did not approach the maximum kernel size of 49 mg at Irricana in 1995. Relative efficiencies of the lattice design ranged from 100% to 289% (Table 15).

A superiority index (SI) and the Genotype by Environment interaction MS (GE) (Table 4) for each cultivar have been calculated according to the procedure described by Lin and Binns [Can. J. Plant Sci. (1988) 68:193-198].

Data from HYWC' test grown under an irrigation regime are presented in Table 16.

HY961 (5700PR) was supported for full registration and HY446 (AC2000) was supported for a 3 year interim registration.

Genotype reaction to diseases were provided from special tests conducted by J. Gilbert, B. McCallum, and J. Menzies, Winnipeg; M.R. Fernandez and R. Dunbar Swift Current; D. Gaudet and B. Puchalski, Lethbridge. All are staff of Agriculture and Agri-food Canada. R. Ferguson, Agriculture and Agri-food Canada, Regina packaged the seed for the tests, prepared the composites for quality determinations, and multiplied the seed stocks. The assessment for end-use suitability was made by K.R. Preston, and D. Hatcher Grain Research Laboratory, and O. Lukow and J. Noll, Research Station, Winnipeg. L. Jamison, Grain Inspection Division, Canadian Grain Commission provided the description of the kernel characteristics. R. M. DePauw, J.M. Clarke, J.G. McLeod, C.W.B. Lendrum, and P. Breakey of Agriculture Canada co-ordinated, analysed, and reported the H.Y.W.'C' test.

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High Yielding Wheat 'C' 2000

Table 1.

Location and Co-Operators

<u>Zone 1</u>	<u>Co-operator</u>	<u>Agency</u>
Glenlea	D. Brown	Agriculture and AgriFood Canada, Winnipeg
Brandon	D. Brown	Agriculture and AgriFood Canada, Winnipeg
Rosebank	K. McCaffum	U.G.G., Agripro
Souris	K. McCaffum	U.G.G., Agripro
Indian Head	D. Gehl	Agriculture and AgriFood Canada, Indian Head
<u>Zone 2</u>		
Regina	R. Ferguson	Agriculture and AgriFood Canada, Regina
Kernen	S. Fox	Crop Science, University of Saskatchewan
Swift Current	R. DePauw	Agriculture and AgriFood Canada, Swift Current
Stewart Valley	R. DePauw	Agriculture and AgriFood Canada, Swift Current
Scott	K. Kirkland	Agriculture and AgriFood Canada
Irricana	T. Ferguson	Agricore
<u>Zone 3</u>		
Lacombe	S. Kibbie	Agriculture and AgriFood Canada, Lacombe
Melfort	C. Vara	Agriculture and AgriFood Canada, Melfort
Lake Lenore	K. Hanson	Saskatchewan Wheat Pool, Watrous
Beaverlodge	A. Olson	Agriculture and AgriFood Canada, Beaverlodge
<u>Irrigation</u>		
Outlook	G. Larson	Sask. Irrigation Development Centre, Outlook
Swift Current	R. DePauw	Agriculture and AgriFood Canada, Swift Current
Bow Island	T. Ferguson	Agricore
Lethbridge	B. Beres	Agriculture and AgriFood Canada, Lethbridge

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High Yield Wheat Coop 2000

Table 2

Entry	IDENTITY	Yr	Color	PARENTAGE	SOURCE
1 BW661	AC Barrie	CWRS			
2 HY395	AC Karma	CPS-W			
3 HY413	AC Vista	CPS-W			
4 HY417	AC Crystal	CPS-R			
5 HY446	AC2000	CPS-W			
6 HY459	9325-EA*06	2 W		HY380/8021-V2//HY416	APWP
7 HY461	P9513-AR23A4	1 R		AC Foremost*2//Glenlea/AC Taber	APWP
8 HY462	P9513-DQ1B	1 R		AC Foremost*2//Glenlea/AC Taber	APWP
9 HY463	P9513-DQ1C	1 R		AC Foremost*2//Glenlea/AC Taber	APWP
10 HY464	9222/AP09*06	1 W		Hartog/8021-V2//HY616	APWP
11 HY465	9222/AP09*10	1 W		Hartog/8021-V2//HY616	APWP
12 HY466	C9600D-012	1 W		Ures/Bow//Opata	U of S
13 HY528	U97016	1 W		AC Karma/HY355+79S9708	U of S
14 HY529	U97019	1 W		AC Karma/HY616	CRC
15 HY644	95W408	3 R		A16/A*4/BgBSR/3/Sceptre/Ning	CRC
16 HY650	96W497	2 R		A16/A*4/BgBSR/4/AC Domain/3/A 16/A*4/BgBSR	CRC
17 HY651	96W509	2 R		A16/A*4/BgBSR/4/AC Domain/3/A 16/A*4/BgBSR	CRC
18 HY652	97W507	1 R		HY616 BSLR/91W1049	CRC
19 HY653	97W1254	1 R		HY617 BSR/FHB37	CRC
20 HY654	97W701	1 R		A16/A*4/BgBSR/4/AC Domain/3/A 16/A*4/BgBSR	CRC
21 HY655	97W748	1 R		A16/A*4/BgBSR/4/AC Domain/3/A 16/A*4/BgBSR	CRC
22 HY656	97W1450	1 R		96Bear 7 (96-97L 3803)	CRC
23 HY962	UGG96-3064	3 R		N89-3003/N87-446/Oslo	UGG-Agipro
24 HY965	UGG97-3200	1 R		N84-3088/AC Vista	UGG-Agipro
25 HY967	UGG98-3068	1 W		AC Vista/N94-3034	UGG-Agipro

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High Yielding Wheat Coop 2000

Table 4

Rank for Yield

Entry	Zone 1				Zone 2				Zone 3				W.C.	S.I. ²	GEI ¹			
	GI	Br	Rb	So	IH	Mean	Rg	Kn	SC	SV	St	Ir	Mean	Lc	Mf	LL	BL	Mean
1 BW661	10	19	7	16	11	12	15	24	21	19	20	25	23	22	25	21	25	23
2 HY395	20	4	10	17	9	10	8	7	6	15	8	6	6	8	18	4	11	8
3 HY413	1	5	9	5	1	3	1	4	14	12	7	10	3	6	1	2	12	2
4 HY417	25	20	21	24	24	25	24	6	1	8	9	3	12	3	6	8	4	13
5 HY446	24	22	16	26	16	24	22	19	15	21	17	22	21	25	13	14	10	18
6 HY459	2	3	6	4	2	1	2	11	3	5	1	5	2	2	19	17	3	11
7 HY461	23	24	19	22	12	23	23	17	9	22	12	2	17	10	8	11	6	20
8 HY462	6	7	8	19	6	7	6	12	7	9	15	14	5	16	2	3	18	6
9 HY463	13	16	11	12	22	14	14	3	11	11	19	19	13	14	4	10	17	10
10 HY464	19	10	24	18	19	19	16	9	2	4	21	12	7	4	23	24	13	17
11 HY465	22	14	20	20	23	21	21	5	5	2	16	20	9	17	24	19	4	19
12 HY466	4	17	13	9	10	9	20	14	10	17	22	21	18	9	5	15	24	13
13 HY528	18	11	17	15	13	16	9	1	4	10	5	1	4	7	3	7	7	11
14 HY529	17	8	23	1	5	8	12	13	22	18	10	11	19	11	20	9	23	16
15 HY644	9	12	2	11	14	6	11	20	17	13	13	23	16	19	11	13	15	14
16 HY650	8	9	12	23	15	13	17	16	16	14	6	15	15	23	16	16	20	21
17 HY651	7	25	5	21	25	22	25	8	18	3	3	4	14	18	15	18	2	15
18 HY652	12	15	14	14	20	15	19	15	8	6	11	9	11	15	22	23	19	20
19 HY653	16	13	16	6	8	11	7	23	23	20	23	18	22	5	10	12	22	12
20 HY654	15	23	25	13	17	20	10	22	25	24	24	24	24	14	20	21	24	24
21 HY655	11	21	22	8	21	17	18	25	24	25	26	16	25	21	17	25	16	23
22 HY656	21	18	15	10	18	18	13	21	20	23	18	8	20	20	21	22	14	22
23 HY962	5	1	4	3	7	4	4	18	19	7	14	13	10	12	12	5	9	7
24 HY966	3	2	3	7	3	2	3	2	12	1	2	7	1	1	9	1	1	1
25 HY967	14	6	1	2	4	5	5	10	12	16	4	17	8	13	7	6	5	4

¹ * The Superiority Index for each experimental line is significantly different from the maximum response (P<0.05)

² * The S.I. indicates GEI interlin between the maximum response and the experimental line is significantly greater than the experimental

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Table 3
High Yielding Wheat Crop 2000
Kilograms Hectare⁻¹

Entry	Zone 1					Zone 2					Zone 3					W.C. Mean			
	Skin	Bran	Rose	Sour	I.M.	Mean	Regi	Kern	S.G.	S.V.	Seet	Ird	Mean	Lag.	Half	L.L.	Brad	Mean	
1 BW661	3345	3953	4541	4272	4524	4127	4058	4339	4513	3801	3734	4012	4226	7326	3789	5388	4199	5170	4446
2 HY395	2734	4846	4399	4292	4726	4193	4572	5249	5213	4463	4128	6102	4971	8721	4307	6950	4960	6235	5049
3 HY413	3958	4821	4463	4755	5513	4702	5614	5415	5072	4688	4147	6039	5196	8803	5637	7449	4937	6706	5434
4 HY417	1987	3953	3882	3650	3883	3471	3189	5294	5571	4970	4088	6168	4880	8803	4924	6502	5184	6378	4810
5 HY448	2024	3789	3951	3279	4370	3484	3582	4881	4977	3727	3801	6858	4436	7163	4424	6072	5121	5695	4454
6 HY459	3886	4835	4575	4851	5422	4734	5872	5147	5527	5203	4509	6117	5313	8927	4289	5858	6306	8089	5327
7 HY461	2103	3624	3894	3879	4435	3687	3655	4926	5264	3898	4025	6332	4636	8444	4814	6334	5168	6197	4712
8 HY462	3479	4855	4508	4230	4836	4338	4865	5133	5307	4970	3835	6658	4978	8089	5380	7235	4544	6337	6127
9 HY463	3217	4308	4313	4345	4183	4074	4091	5427	5223	4889	3768	5780	4829	8281	5019	6361	4752	6103	4817
10 HY464	2738	4582	3619	4235	4250	3847	4019	5184	5545	5280	3733	5978	4953	8832	4122	5197	4912	5786	4801
11 HY465	2205	4362	3889	4088	4152	3733	3604	5284	5493	5368	3890	5768	4808	8071	3982	6384	5289	5676	4721
12 HY466	3780	4010	4234	4499	4585	4222	3833	5058	5240	4158	3728	6073	4615	8678	4954	6051	4282	5891	4851
13 HY528	2773	4586	3983	4281	4423	3999	4460	5508	5493	4867	4316	6378	5168	8723	5098	8879	6182	8420	6113
14 HY529	2841	4606	3747	5032	4966	4238	4250	5967	4385	3893	4078	6011	4614	8415	4229	6464	4305	5853	4819
15 HY644	3378	4435	5009	4465	4417	4341	4390	4672	4866	4585	4005	5663	4697	7944	4652	6168	4792	5889	4898
16 HY660	3412	4605	4282	3743	4394	4087	3913	4837	4910	4582	4181	5842	4746	7271	4361	5930	4521	5518	4732
17 HY651	3462	2987	4642	3988	3409	3698	2741	5290	4857	5320	4380	6144	4779	7844	4355	5783	5427	5877	4711
18 HY652	3238	4324	4100	4299	4202	4033	3881	4863	6307	5093	4032	6047	4889	8096	4189	5301	4807	5548	4779
19 HY653	3088	4402	4004	4648	4738	4176	4695	4340	4321	3746	3705	5848	4426	8830	4700	6238	4463	6058	4776
20 HY654	3211	3678	3414	4320	4363	3797	4383	4353	4820	3392	3820	5431	4201	7168	4383	5699	4498	5356	4375
21 HY665	3321	3882	3805	4524	4190	3944	3892	4268	4129	2188	3607	5815	3988	7655	4313	4889	4761	6380	4348
22 HY668	2687	3987	4009	4485	4271	3888	4184	4412	4669	3624	3789	6097	4439	7588	4204	5333	4826	5487	4535
23 HY662	3700	6147	4762	4973	4757	4688	4771	4923	4754	5028	3958	5662	4898	8404	4638	6929	5121	6248	5182
24 HY666	3838	5072	4865	4544	5184	4703	5216	6434	5204	5742	4467	6100	5391	9138	4722	7855	5583	8774	5519
25 HY667	3216	4860	5070	4887	5114	4638	4713	5155	5204	4425	4322	5848	4944	8378	4823	6738	5231	5318	5203
Mean	3105	4331	4230	4345	4533	4109	4230	4987	5007	4455	3981	5915	4784	8228	4677	6165	4882	5933	4885
LSD	368	265	263	324	537	439	508	166	280	384	323	406	490	881	434	444	345	594	310
CV	7.2	3.7	3.8	4.5	7.2	7.2	2.0	3.1	5.2	4.9	4.1	6.5	6.7	3.3	4.3				
# Raps	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	

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Table 5 Maturity - days

High Yielding Wheat Crop 2000

High Yielding Wheat Coop 2005

Table 6

Lodging 1-8

Entry	Zone 1				Zone 2				Zone 3				W.C. Mean
	Glen		Bran	I.H.	Regl		Kem	Imi	Loc.		Melt	L.L.	
	1.0	3.0	1.0	1.7	1.6	4.9	0.9	2.6	1.6	4.9	0.9	2.6	
1 BW661	6.3	3.2	2.0	3.9									2.7
2 HY395	7.6	3.2	1.8	4.2	1.0	3.3	1.0	1.8	1.3	6.4	1.8	3.1	3.0
3 HY413	7.0	5.3	1.4	4.6	1.0	5.0	1.5	2.5	1.6	7.0	1.5	3.4	3.5
4 HY417	8.0	4.0	1.1	4.4	1.0	3.0	1.0	1.7	1.4	3.4	1.1	2.0	2.7
5 HY446	7.4	3.9	1.3	4.2	1.0	2.7	1.1	1.6	1.1	5.0	1.2	2.4	2.7
6 HY459	8.4	7.7	1.6	5.9	1.7	4.9	1.5	2.7	1.1	4.3	0.8	2.0	3.5
7 HY461	8.7	2.9	1.3	4.3	1.0	3.4	1.0	1.8	1.3	3.7	1.1	2.0	2.7
8 HY462	7.6	1.9	1.3	3.6	1.0	2.0	1.1	1.4	0.8	2.3	0.9	1.4	2.1
9 HY463	7.3	3.1	1.1	3.8	1.0	3.0	1.0	1.7	1.3	1.8	1.2	1.4	2.3
10 HY464	8.1	1.8	1.2	3.7	1.0	5.0	2.0	2.7	2.0	6.0	1.8	3.3	3.2
11 HY465	8.0	2.7	1.2	4.0	1.0	5.0	2.0	2.7	2.3	3.7	1.8	2.6	3.1
12 HY466	6.3	1.7	1.1	3.0	1.0	2.9	1.0	1.6	0.6	1.3	1.1	1.0	1.9
13 HY528	7.3	3.1	1.4	3.9	1.3	4.0	1.0	2.1	1.6	4.6	2.6	2.9	3.0
14 HY529	8.0	4.4	3.4	5.3	2.0	4.3	1.0	2.4	2.4	7.4	1.8	3.9	3.9
15 HY644	6.0	5.1	2.7	4.6	1.7	5.3	1.6	2.8	2.2	5.9	3.2	3.8	3.7
16 HY650	6.7	5.1	2.0	4.6	2.0	4.7	1.9	2.9	1.7	4.7	2.7	3.0	3.5
17 HY651	6.7	4.5	1.0	4.1	1.0	4.0	1.6	2.2	2.2	2.8	1.2	2.1	2.8
18 HY652	7.7	3.4	1.1	4.0	1.0	4.3	1.5	2.3	1.9	3.4	1.2	2.2	2.6
19 HY653	6.7	4.5	1.4	4.2	1.0	3.3	1.0	1.8	1.8	5.4	1.4	2.8	2.9
20 HY654	6.0	2.3	1.8	3.4	1.0	3.1	1.0	1.7	1.0	3.2	2.0	2.1	2.4
21 HY655	6.0	4.3	1.3	3.9	1.0	3.0	1.0	1.7	2.0	6.3	1.3	3.2	3.2
22 HY656	4.9	2.9	1.4	3.1	1.0	3.1	1.0	1.7	0.5	2.6	1.2	1.4	2.1
23 HY962	6.7	7.3	1.1	5.0	1.0	3.1	1.0	1.7	1.3	6.6	1.4	3.1	3.3
24 HY966	6.6	6.6	1.7	5.0	1.0	4.3	0.9	2.1	2.4	6.7	2.0	3.7	3.6
25 HY967	6.7	5.6	1.1	4.5	1.0	4.0	1.0	2.0	1.3	6.8	0.9	3.0	3.2
Mean	7.1	4.0	1.5	4.2	1.1	3.7	1.2	2.0	1.5	4.7	1.5	2.6	2.9
1 SD	0.9	1.7	0.7	1.8	0.3	0.6	0.6	0.8	1.2	2.5	1.3	1.6	0.8

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200500305

Table 7

High Yielding Wheat Coop 2000

Height - cm

Entry	Zone 1				Zone 2				Zone 3				W.C.				
	Bran	Ross	Sour	I.H.	Mean	Regl	Kern	S.C.	S.V.	Scot	Intl	Mean	Lac.	Mef	L.L.	Bwd	Mean
1 BW661	99	102	99	103	101	102	95	91	100	89	89	98	110	106	106	94	104
2 HY395	87	91	85	88	88	81	87	89	97	85	87	88	101	97	92	86	94
3 HY413	91	93	89	91	91	90	90	91	99	95	91	91	101	99	99	93	90
4 HY417	88	88	80	91	87	81	86	81	84	85	85	86	94	91	89	89	87
5 HY446	87	91	83	87	87	85	88	87	98	82	85	87	93	95	91	85	88
6 HY459	88	96	85	91	91	93	90	90	97	89	94	92	104	100	98	88	93
7 HY461	81	87	79	89	84	78	83	79	91	77	80	81	90	89	89	87	84
8 HY462	77	83	73	77	78	78	78	72	88	73	77	78	86	88	80	78	83
9 HY463	76	81	74	79	78	77	78	72	89	70	76	77	90	89	81	72	79
10 HY464	82	85	78	82	82	77	81	78	86	70	78	79	92	89	84	79	82
11 HY465	85	91	80	86	85	81	82	77	97	76	80	82	93	93	87	80	85
12 HY466	89	88	78	79	83	76	87	78	85	76	85	82	84	92	90	81	87
13 HY528	91	95	87	94	92	87	87	87	103	89	89	90	99	99	95	94	92
14 HY529	93	95	94	93	94	92	90	90	106	92	90	93	105	98	96	91	95
15 HY644	91	93	86	86	89	86	91	89	99	85	91	90	103	96	94	91	91
16 HY650	87	88	81	86	86	86	86	86	95	86	84	87	97	94	99	93	94
17 HY651	86	87	81	78	83	80	85	81	95	78	82	84	98	98	97	93	96
18 HY652	81	89	83	84	84	80	85	81	95	80	86	84	93	93	87	81	85
19 HY653	94	96	89	94	93	92	91	90	109	89	92	94	103	100	101	98	95
20 HY654	92	95	91	90	92	86	92	92	99	92	98	84	98	92	91	100	95
21 HY655	93	97	89	99	95	85	93	92	104	85	90	91	103	101	96	93	96
22 HY656	89	95	87	91	91	86	90	91	101	82	89	90	102	99	94	95	91
23 HY662	89	80	85	88	88	86	83	85	92	81	83	85	98	98	96	84	88
24 HY966	94	97	91	94	94	91	91	87	98	87	92	91	103	100	97	95	94
25 HY967	91	93	90	85	89	86	86	84	98	83	92	88	94	100	96	86	90
Mean	88.1	91.4	84.7	88.2	88.1	85.0	87.0	84.7	97.0	82.1	87.1	87.2	97.3	96.4	92.9	84.5	82.8
LSD	5.8	5.5	5.3	3.7	3.1	5.5	4.2	5.5	4.3	4.1	5.3	2.9	6.8	4.5	3.6	6.3	3.4
CV	1.0	3.6	3.8	2.6	3.9	2.9	4.0	2.7	3.0	3.7	4.2	2.8	1.9	3.2			
# Reps	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2

High Yielding Wheat Coop 2000

Table 8

Kilograms Hecto Lbs⁴

Entry	Glen	Brain	Sour	Eigl	I.H.	Mean	Zone 1			Zone 2			Zone 3			W.C.	Mean		
							Regd	Kern	S.C.	S.V.	Scot	Intf	Mean	Lag.	Half	L.I.	Evid		
1 BW661	75.9	78.1	80.4	80.3	78.7	78.7	80.5	82.0	82.7	81.2	81.3	81.5	81.5	80.8	81.5	82.4	80.5	81.2	80.5
2 HY395	73.7	73.5	74.8	75.2	77.5	74.9	78.7	81.3	82.6	80.3	81.0	82.0	81.9	79.5	77.2	80.3	81.0	79.5	78.6
3 HY413	74.2	72.8	72.4	78.2	75.6	74.2	77.7	78.8	81.1	79.1	79.9	79.9	79.4	77.6	78.9	79.4	78.4	78.4	77.4
4 HY417	69.8	70.5	71.9	75.5	76.4	72.8	76.7	82.1	82.3	81.9	81.5	81.7	81.0	79.0	79.3	80.7	80.1	79.8	78.0
5 HY446	69.7	73.6	75.2	76.4	77.7	74.5	78.0	81.6	80.7	80.9	79.5	78.8	80.1	76.6	77.3	80.3	80.6	78.7	77.9
6 HY459	75.9	74.0	74.4	78.1	78.0	76.1	79.3	81.7	82.4	81.2	80.9	81.8	81.2	79.9	77.8	79.6	81.1	79.6	79.1
7 HY461	70.0	69.6	73.8	75.2	75.1	72.8	75.8	80.4	82.1	80.7	80.1	81.5	80.1	78.7	75.4	79.5	80.2	78.4	77.2
8 HY462	76.5	74.3	76.8	79.2	77.8	76.9	80.7	81.9	83.0	81.5	81.3	81.9	81.7	77.8	79.0	80.8	78.2	79.0	79.4
9 HY463	75.5	72.8	76.0	77.9	77.4	75.9	79.7	81.5	82.5	80.8	82.0	81.6	81.4	78.5	77.7	80.6	78.6	78.9	78.9
10 HY464	72.0	72.1	74.4	74.8	74.0	73.4	76.5	79.9	82.7	81.1	80.1	80.9	80.2	78.0	72.1	77.6	80.7	77.1	77.1
11 HY465	67.9	70.1	73.8	74.3	72.5	71.7	75.0	80.7	83.1	81.1	80.1	81.3	80.2	79.0	73.0	78.2	81.5	77.9	76.8
12 HY466	76.0	75.3	76.7	78.5	75.8	76.5	79.5	80.9	81.5	81.3	80.1	79.7	80.5	78.0	79.1	80.1	78.3	78.9	78.7
13 HY528	72.3	71.9	70.0	74.0	74.4	72.5	77.1	80.2	81.0	79.3	81.2	80.4	79.9	76.4	77.2	78.6	79.0	77.8	76.9
14 HY529	74.3	74.9	73.1	78.2	76.0	75.3	79.3	81.5	82.2	81.4	81.2	81.7	81.2	78.7	75.6	79.0	80.4	78.4	78.5
15 HY644	76.2	74.3	79.8	77.4	77.9	77.1	78.7	79.3	81.4	80.7	80.5	80.7	80.2	76.8	76.6	79.7	77.4	77.6	78.5
16 HY650	77.6	78.7	80.0	80.4	77.5	78.8	81.0	82.3	84.9	82.6	83.1	83.5	82.9	81.4	79.3	81.7	81.8	81.0	81.0
17 HY651	76.4	73.9	77.9	79.5	77.8	77.1	79.2	82.3	83.3	83.8	82.0	82.4	82.2	78.1	77.8	80.1	79.9	79.0	79.6
18 HY652	72.5	72.9	74.3	74.9	74.4	73.8	78.1	78.8	81.0	79.9	78.8	80.5	79.5	77.1	73.6	76.7	78.8	76.6	76.8
19 HY653	76.7	75.7	77.3	78.9	78.9	77.5	80.3	81.2	82.3	81.5	80.0	80.7	81.0	77.2	78.3	80.6	78.1	78.5	79.2
20 HY654	76.9	76.5	76.2	79.4	79.3	77.7	81.0	81.5	82.9	81.5	80.5	80.9	81.4	78.2	78.9	79.7	77.8	78.6	79.4
21 HY655	77.3	75.4	77.8	79.1	79.1	77.7	80.4	81.1	82.9	81.1	81.0	81.3	81.3	76.5	76.5	79.7	78.4	77.8	79.2
22 HY656	75.5	74.7	77.5	78.4	76.0	76.8	79.4	80.9	81.9	81.3	80.1	81.3	80.8	76.5	77.1	78.9	78.8	77.8	78.7
23 HY662	76.3	74.0	77.3	76.8	76.5	76.2	78.7	80.7	80.3	80.4	78.4	80.2	80.0	79.6	75.8	80.3	78.7	78.6	78.3
24 HY666	75.9	72.3	76.4	76.4	77.5	75.5	78.1	80.0	80.9	80.6	79.8	80.6	80.0	76.1	76.3	80.2	76.5	77.3	77.8
25 HY667	72.8	71.4	74.7	75.9	75.2	74.0	76.3	78.2	79.4	78.8	78.1	78.9	78.3	76.1	74.7	77.4	77.0	76.3	76.3
Mean	74.3	73.7	75.7	77.2	76.8	75.5	78.6	80.8	82.1	81.0	80.5	81.1	80.7	78.1	77.0	79.7	79.3	78.5	78.4
C.V.														1.7				2.2	3.7
														1.5				2.5	2.1

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High Yielding Wheat Coop 2000

Table 9

1000 kernel weight - gms

Entry	Zone 1			Zone 2			Zone 3			W.C.									
	Glen	Bran	Rose	Sour	I.H.	Mean	Regi	Kern	S.C.	S.Y.	Scot	Int	Mean	Loc.	Wif	L.L.	Bvid	Mean	Mean
1 BW661	27.5	30.5	36.0	32.0	31.5	31.5	32.5	36.5	33.5	35.0	36.5	36.5	35.1	41.5	31.5	33.5	39.5	36.5	34.3
2 HY395	26.0	31.0	33.5	30.5	35.0	31.2	32.5	38.0	41.0	38.0	43.0	41.0	38.9	42.0	30.0	36.0	44.0	38.0	36.1
3 HY413	35.5	33.0	35.0	34.5	39.0	35.4	39.0	42.5	42.0	42.0	47.5	45.0	43.0	44.5	35.5	42.5	45.5	42.0	40.2
4 HY417	23.5	28.0	29.0	30.5	33.0	28.4	30.0	40.0	41.0	39.5	44.5	41.5	39.4	41.5	33.0	36.0	46.0	39.1	35.7
5 HY446	23.0	29.0	34.5	33.0	34.5	30.8	32.5	40.0	37.0	40.5	39.0	41.5	38.4	39.0	33.5	38.0	43.5	36.5	35.9
6 HY459	33.0	31.0	36.0	32.5	36.0	33.7	36.5	40.5	41.0	41.0	45.5	43.0	41.3	44.5	31.0	36.5	45.5	39.1	38.2
7 HY461	24.5	26.5	31.5	29.5	33.5	29.1	32.0	40.5	42.5	39.0	45.0	42.5	40.3	44.0	30.0	39.0	46.0	39.8	36.4
8 HY462	32.5	35.5	35.0	37.5	34.6	39.5	41.5	42.5	41.5	47.0	43.0	42.5	41.0	33.5	41.5	44.5	40.1	39.2	
9 HY463	32.0	31.0	36.5	33.0	36.0	33.7	37.5	40.5	43.0	40.5	48.5	44.5	42.4	38.5	32.5	40.5	47.5	40.0	38.9
10 HY464	31.0	30.5	38.5	33.0	36.0	33.8	37.5	39.5	45.5	44.5	47.5	45.5	43.3	44.5	28.5	35.0	49.5	39.4	38.1
11 HY465	25.0	29.5	35.5	32.0	35.0	31.4	36.0	42.0	44.5	46.5	45.5	44.5	43.2	45.5	29.5	35.0	49.0	38.8	38.3
12 HY466	33.0	35.0	40.5	36.5	38.5	36.7	42.0	46.0	39.0	45.5	44.5	46.0	43.8	48.0	38.5	42.0	53.0	45.4	41.9
13 HY528	27.5	31.5	33.0	31.0	37.0	32.0	37.0	41.0	41.0	42.0	49.5	47.0	42.9	43.0	32.5	38.0	48.0	40.4	38.6
14 HY529	29.0	36.5	34.5	35.5	36.5	34.4	39.5	41.0	42.5	41.5	46.6	41.5	42.1	46.0	30.5	37.5	47.5	40.4	39.1
15 HY644	33.5	31.0	37.0	30.5	34.0	33.2	36.5	39.5	37.5	39.0	42.5	40.5	39.3	41.5	31.0	37.0	42.0	37.9	36.9
16 HY650	33.0	32.5	39.5	35.0	33.0	34.6	37.5	38.0	42.0	40.5	43.0	42.0	40.5	42.5	31.5	37.0	43.5	38.6	38.0
17 HY651	33.0	30.5	36.5	35.0	35.0	34.0	38.0	41.5	36.5	45.5	47.0	45.5	42.3	38.0	30.5	38.0	50.0	39.1	38.7
18 HY652	30.0	31.5	36.0	32.5	32.5	32.5	37.5	36.5	41.5	40.0	43.0	42.0	40.1	40.5	26.5	34.0	43.5	36.6	36.6
19 HY653	36.0	36.0	38.5	39.0	42.5	38.4	43.5	47.0	45.5	46.5	48.0	45.7	47.0	36.0	42.5	48.5	43.0	42.5	
20 HY654	34.0	36.0	39.0	37.5	41.0	37.5	42.5	44.0	45.0	42.0	47.0	46.5	44.5	44.5	34.5	38.5	46.5	41.0	41.2
21 HY655	35.0	35.5	39.5	35.5	37.5	36.6	40.0	44.0	44.0	42.5	47.0	44.5	43.7	43.0	29.0	38.5	43.5	36.5	39.9
22 HY656	30.0	27.5	33.0	32.5	34.0	31.4	36.0	38.5	39.5	40.0	41.5	41.5	39.5	38.0	30.0	34.0	40.5	35.6	35.8
23 HY662	33.5	32.5	37.0	34.5	36.0	34.5	39.0	41.0	40.5	41.0	42.5	41.0	40.8	42.5	32.5	39.5	43.5	39.5	38.4
24 HY666	33.5	33.0	38.5	34.5	39.0	35.7	38.5	41.0	40.0	43.0	44.5	41.7	43.5	37.0	42.0	48.0	42.1	39.8	
25 HY667	28.5	28.5	33.0	32.5	35.0	31.5	36.5	35.5	37.0	38.0	37.5	39.0	37.3	37.0	31.0	35.5	40.0	35.9	35.0
Mean	30.5	31.5	35.9	33.5	35.9	33.5	37.2	40.6	41.0	41.4	44.4	43.0	41.3	42.5	32.1	37.9	45.4	38.5	38.2
C.V.																		15.7	13.8
LSD																		3.7	3.8

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四百一

Entry	Severity	Reaction	Leaf Rust Seeding Infection						Stem Rust Seeding Infection					
			183-1 MBDS	122-1 MBSD	74-2 MASJ	77-21 JBL	Field	Stem	Rust	Reaction	Field	Stem	Rust	Reaction
1 BW661	50	MRMS	11+	11-	3+	3+	OR	OR	12	2	12	12	0	0
2 HY395	45	MRMS	2+3	1-	3+	3	OR	OR	12	3	11-	11-	0	0
3 HY413	50	MRMS	3	1-1=	22+	1-	TR	TR	11-	12	0	11-	11-	11-
4 HY417	35	MR	3+	12-0	1+2	1=	OR	OR	12-	2	1-	11-	11-	11-
5 HY446	50	MRMS	3+	12-0	3+	23?	TR	TR	33+	12+	12	12	11-	11-
6 HY459	25	MRMS	3	1=	1-	1=	OR	OR	11	23	0	11-	0	0
7 HY461	15	MR	3+	3+	3+	11-	TR	TR	11+	11-	1	11-	11-	11-
8 HY462	Tr Tr	3+	11-	12+	11=	11-	TR	TR	11+	12-	0	11-	11-	11-
9 HY463	15	MR	3	11-	12	11-	TR	TR	11-	12	0	11-	11-	11-
10 HY464	45	MRMS	3+	3+	3+	3+	TR	TR	11-	12+	0	11-	11-	11-
11 HY465	70	S	3+	3+	3+	3+	OR	TR	11-	12+	0	11-	11-	11-
12 HY466	5	MR	11+	11-	11-	11-	TR	TR	11-	12-	0	11-	11-	11-
13 HY528	5	MR	1+	12=	3+	22-	OR	OR	11-	12-	0	11-	11-	11-
14 HY529	Tr Tr	2-	11-	22+	11-	22-	OR	OR	11-	2	12-	11-	11-	11-
15 HY644	35	MRMS	3+	11-2=	12-	22-	TR	TR	0	33+112+11	11	11-	11-	11-
16 HY650	45	MRMS	3+	11-2=	11-	11-	OR	OR	11-	12	0	11-	11-	11-
17 HY651	20	MR	3+	3+	3+	3	OR	OR	11-	12	0	11-	11-	11-
18 HY652	Tr Tr	22-	12/3	22+	3+	22+	OR	OR	11-	12	0	11-	11-	11-
19 HY653	5	MR	3+	3+	2	2	OR	OR	11-	12	0	11-	11-	11-
20 HY654	5	MR	3	2	11-	11-	OR	OR	11-	12	0	11-	11-	11-
21 HY655	10	MR	3+	22-	3	3	OR	OR	11-	12	0	11-	11-	11-
22 HY656	20	MRMS	3+	22-	3+	3+	OR	OR	11-	12	0	11-	11-	11-
23 HY982	Tr Tr	11+	11-	11-	11-	11-	OR	OR	11-	12	0	11-	11-	11-
24 HY986	15	RMR	22-	11-	11-	11-	OR	OR	11-	12	0	11-	11-	11-
25 HY987	15	MR	22+	11-2=	11-	11-	OR	OR	11-	12	0	11-	11-	11-

Inoculated with leaf rust faces MBDS (44%), TGBU (17%), THBL (17%), MCDS (4%), TBBU (4%), TCBU (2%), TCMU (2%), MDRU (2%), MBRU (2%), 11 others totalling (6%). The stem rust field reaction data is very poor this year due to extremely low infection and may not be very reliable compared to previous year's rust data.

Inoculated with stem tissue TMR, RHT, QTH, RKG, TPN, STH, and MCC.

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High Yielding Wheat Coop 2000

Table 11

Entry	Bunt Type	% Inf.	Loose Smut ^z	Glares					S. nodorum					
				S.C.W	SC	SC	SC	FHBX	TKW	McFadden's Scale ^w	TKW	McFadden's Scale ^w	Redn %	McFadden's Scale ^w
1 BW661	29 MS	3	R	8.3	26	0	65	27	10.0	11.0	8.0	8.0	8.0	8.0
2 HY395	0 VR	50	I	a	7.8	85	0	15	60	10.2*	11.0	20.0	13.6	8.7
3 HY413	3 VR		b	7.8	94	0	6	48	13.8*	11.0	11.0	9.7		
4 HY417	0 VR	64	MS	7.3	68	0	30	52	16.9*	11.0	11.0	22.0		
5 HY446	3 VR		b	8.0	70	0	22	38	16.3*	11.0				
6 HY459	2 VR	0	R	a	8.3	73	1	26	54	11.7*	10.7	9.3	9.3	8.7
7 HY461	0 VR	0	R	a	7.8	54	0	46	57	4.1	11.0	4.7	9.0	9.0
8 HY462	3 VR	50	I	a	7.0	75	13	0	58	12.1	10.0	24.2	8.0	8.0
9 HY463	1 VR	0	R	a	7.0	69	13	18	53	16.2*	10.0	26.5	8.0	8.0
10 HY464	15 MR		b	9.0	52	0	46	70	22.2*	11.0	11.0	19.6	8.0	8.0
11 HY465	27 MS	25	MR	a	9.0	49	0	61	76	9.9*	11.0	9.1		
12 HY466	24 I	0	R	8.5	89	0	11	42	17.5*	10.3	14.7			8.0
13 HY528	0 VR	14	R	a	8.0	74	0	23	36	19.8	10.5	28.1		9.0
14 HY529	0 VR	0	R	a	8.0	85	0	14	30	17.0*	10.3	20.2*		9.0
15 HY644	49 S	0	R		7.8	61	0	39	3	11.8*	10.3	14.1		8.0
16 HY650	0 VR	4	R	9.3	78	0	18	20	14.3*		11.0	11.5		9.3
17 HY651	5 VR	20	MR	8.5	66	4	26	27	12.7		11.0	10.5		9.3
18 HY652	1 VR		b	9.0	88	0	12	68	19.3*		11.0	13.1		8.0
19 HY653	0 VR	0	R	a	8.0	41	0	58	58	11.5		18.8		
20 HY654	1 VR	0	R	a	7.8	47	0	50	68	12.3*		10.3		16.8
21 HY655	0 VR	0	R	a	8.0	59	0	37	58	14.2*		10.0		16.3*
22 HY656	0 VR	0	R	8.0	64	0	33	51	17.1*		10.0	19.1		
23 HY962	24 I	29	MR	7.8	90	0	10	41	16.2*		11.0	15.9		8.0
24 HY986	30 MS	81	S	8.0	91	0	6	34	14.6*		10.7	19.9		8.0
25 HY967	20 I	17	MR	a	7.5	78	0	21	54	14.0		11.0		17.5

^z Inoculated with races T2, T9, T10 and T39. ^a = assessment made on less than 10 plants. ^b = not enough seed for testing^y percent isolation of the main leaf spotting pathogens (*Pyrenopeziza tritici-repentis*, *Septoria nodorum* and *S. tritici*).Other fungi isolated at lower frequencies included *S. avenae* f.sp. *lutescens* and *Cochliobolus sativus*.^x Disease severity = mean incidence * mean severity.^w McFadden's 0 - 11 Scale. < 5 = R; 6 = MR; 7 = I; 8-9 = MS; 10-11 = S.^{*} Mean thousand kernel weight difference between non-inoculated control and inoculated plots significant at p< 0.05.

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High Yielding Wheat Coop 2000

Table 12
2 Year Averages 1998 - 2000

Entry	Yield Kilograms hectare ⁻¹			Maturity - days			Ht	Lodg	Kg/ha ⁻¹	MKWT		
	Zone 1	Zone 2	Zone 3	Mean	Zone 1	Zone 2	Zone 3	Mean				
BW661	3927	4338	4529	4252	99	110	115	108	100	2.3	80.8	34.6
HY395	3815	5182	5351	4771	104	111	118	111	90	2.6	78.5	34.7
HY413	4529	5270	5768	5156	101	110	117	109	91	2.9	77.5	40.0
HY417	3167	5016	5399	4502	104	112	120	112	87	2.3	77.6	34.8
HY446	3200	4802	4881	4289	104	113	118	112	88	2.1	77.5	35.1
HY459	4629	5430	5409	5157	104	112	118	111	92	2.9	79.3	38.1
HY644	4291	4822	5122	4725	105	113	117	112	90	3.0	78.6	37.0
HY650	4040	4728	4690	4510	102	111	116	110	88	2.6	81.4	38.3
HY651	3859	4688	5120	4527	103	113	117	112	85	2.2	79.6	38.4
HY962	4657	5116	5432	5047	104	111	118	111	87	2.5	78.1	38.0
# Stations	10	12	8	30	8	9	8	25	28	17	30	30

Table 13
3 Year Averages 1998 - 2000

Entry	Yield Kilograms hectare ⁻¹			Maturity - days			Ht	Lodg	Kg/ha ⁻¹	MKWT		
	Zone 1	Zone 2	Zone 3	Mean	Zone 1	Zone 2	Zone 3	Mean				
BW661	3896	4067	4555	4140	96	105	108	103	99	2.1	80.8	34.5
HY395	4071	4798	5288	4686	100	106	111	106	88	2.4	78.8	35.2
HY413	4529	4875	5655	4968	98	105	109	104	90	2.6	77.8	40.2
HY417	3527	4765	5374	4515	101	108	113	107	86	2.1	78.2	35.6
HY446	3577	4525	4988	4332	101	108	111	107	87	1.9	77.9	35.8
HY644	4240	4406	5011	4612	101	108	111	108	88	3.1	78.8	37.1
HY962	4553	4714	5401	4844	99	106	111	105	86	2.2	78.2	38.3
# Stations	15	18	12	45	13	14	12	39	42	25	45	45

Table 14

High Yielding Wheat 'C' 2000

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Entry	Bunt		Common Root Rot		Loose Strut		Leaf Spot								
	1998	1999	2000	1998	1999	2000	1998	1999	2000	I.H.	S.C.	I.H.D.	I.H.M.	I.H.	Reg.
BW661	181	29 MS	62	No	33 MR	50 I	0R	3R	6.8	6.3	8.0	7.4	9.3		
HY395	No	2 R	0 VR	25	75	No	9.0	8.0	8.0	7.3	8.5	8.0	9.0		
HY413	Data	3 R	3 VR	10	65	Data	9.3	8.0	7.5	7.0	10.0	7.0	8.6		
HY417		3 R	0 VR	24	72		75S	0R	4 MS	7.0	6.5*	7.0	7.0	7.6	9.9
HY446		2 R	3 VR	29	71		0R	15R	8.5	7.8	7.3	7.0	7.5	8.0	9.7
HY459		2 R	2 VR		55		0R	0R		7.8	6.7	8.0	6.7	8.0	
HY644	53 S+	49 S	21		83		13R	15R	0R	9.0	8.3	7.0	8.0	6.4	7.6
HY650	0 R	0 VR			41		20MR	4 R			7.8	8.3	10.0	8.6	9.4
HY651	5 MR	5 VR			39		40MS	0 MR			7.2	10.3	9.0	6.6	6.6
HY962	39 S+	24 I	17		56		21MR	36MS	9 MR	7.8	7.0*	6.8	6.3	7.5	7.9
FHB Index															
Entry	1998	1999	2000	1998	1999	2000	1998	1999	2000	I.R	T.R	T.R	T.R	T.R	
BW661	80MRMS	60MRMS	50MRMS	10MR	10MR	0R	No	No	No	5	27				
HY395	60MRMS	20MRMS	45MRMS	1.1	10MR	0R	No	No	No	24	60				
HY413	80MRMS	40MRMS	60MRMS	1.1	15MR	T.R	Data	Data	Data	38	48				
HY417	80MRMS	40MR	35MR	10.1	20MR	0R				36	52				
HY446	60MS	60MS-S	50MRMS	1.1	20MR	T.R				22	38				
HY459		10MR	25MRMS	10MR		T.R				38	54				
HY644	70MS	15MR	35MRMS	5.3	25MS	T.R				1	3				
HY650		25MRMS	45MRMS	Tr		0R				39	20				
HY651		3 R	20MR	Tr		0R				31	27				
HY962		5 R		1.1		0R				19	41				

*Stem Rust for 2000 is questionable due to low infection and may not be reliably comparable to previous years results.

High Yielding Wheat 'C' 2000

Table 15

Dryland locations								Irrigated locations			
Location	EEMS*	R.E.Y.	DF	F	Seeding Date	Type	Fertilizer Kg ha ⁻¹	Herbicide	Harvested Area M ²	Achieved DG	Prestige A+B
Zone 1											
Glenlea	49321	111.9	74	20.50	May 24	29-9-0	91	24D Amite, Refine Extra	3.66	3.66	
Brandon	25534	289.3	74	31.29	May 03	82-0-0	37	AchieveDG, BuckIM	3.66		
Rosebank	25128	259.8	74	24.22	May 01	11-52-0	15	AchieveDG	3.60		
Souris	38683	100.8	74	14.01	May 03	82-0-0	41	Lontrel, MCPEsther	3.60		
Indian Head	104976	102.1	73	6.43	May 08	27-18-7	300	Refine E, Accord	2.76		
								Refine E, Achieve			
Zone 2											
Regina	93446	111.4	74	15.77	May 08	17-20-0-15	82	AchieveDG/BuckIM	2.76		
Kamsk	10041	219.5	72	43.37	May 23	12-51-0	23	BuckIM/Horizon	4.46		
Swift Current	24671	126.7	74	26.80	May 01	12-51-0		AchieveExtra Gold	2.76		
Stewart Valley	53760	107.8	74	36.11	May 17	28-26-0	134	Refine Extra+Horizon	2.76		
Scott	38141	159.3	74	6.11	May 03	18-22-8-9	45	BuckIM	5.00		
Irincana	59044	136.0	74	4.51	Apr 27	15N 16P 5S		BuckIM	4.13		
Zone 3											
Lacombe	282647	116.9	73	4.02	May 16	17-22-17	7	Glean, Lontrel	2.74		
Malfoot	68810	100.3	74	8.55	May 16	11-51-0	45	BuckIM	5.76		
Lake Lenore	40600	113.7	49	23.72	May 08	11-51-0	80	AchieveDG/BuckIM	3.56		
Beaverlodge	43464	139.0	74	10.02	May 01	11-51-0	112	BuckIM	5.14		

Location	EEMS*	R.E.Y.	DF	F	Seeding Date	Type	Fertilizer Kg ha ⁻¹	Herbicide	Harvested Area M ²	Achieved DG	Prestige A+B
Leithbridge	235079	106.0	98	8.13	May 09	None	45			2.71	
Outlook	334323	430.4	98	2.31	May 25	12-51-0	23	BuckIM		7.01	
Swift Current	Hail damaged	119.6	74	8.16	May 23	90-120-0-10	45	AchieveDG			
Row Island	253620							Prestige A+B			4.13

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Table 16 High Yielding Wheat Irrigated Coop 2000

Entry	Kilograms Hectare ⁻¹			Rank for Yield			Maturity - days			Lodging 1 - 9			Height - cm			Height - cm			
	Leth	Outl	B.I.	Mean	Lb	Cr	B.I.	Mean	Leth	Outl	B.I.	Mean	Outl	B.I.	Mean	Leth	Outl	B.I.	Mean
1 BW861	5030	3804	4667	4501	24	8	12	20	101	103	94	93	1.1	4.3	2.7	85	82	91	86
2 HY385	6467	3624	5016	5036	9	14	8	10	104	103	90	99	1.5	2.3	1.9	77	76	88	80
3 HY413	5617	3893	4578	4728	19	5	17	16	104	103	83	96	1.1	5.7	3.4	72	76	86	76
4 HY417	6318	4214	4854	5082	11	3	14	9	105	104	90	99	1.0	2.7	1.8	72	70	85	76
5 HY446	6164	4167	6151	5160	14	4	5	6	105	105	92	101	1.2	2.0	1.6	75	72	84	77
6 HY469	6812	3723	6038	5524	5	11	2	2	104	103	90	99	1.1	4.3	2.7	78	74	88	80
7 HY461	6287	3538	4722	4852	13	16	11	13	106	105	91	100	1.0	1.3	1.2	70	68	84	74
8 HY462	6798	3634	5000	5144	6	13	9	7	107	104	89	100	1.0	2.0	1.5	70	66	83	73
9 HY463	6354	3735	4554	4881	10	10	18	12	105	104	89	99	1.0	1.3	1.2	66	68	80	71
10 HY464	6675	3362	4637	4891	7	19	15	11	106	103	92	100	1.0	3.0	2.0	67	67	82	72
11 HY465	7147	3508	5114	5256	1	17	6	4	105	103	92	100	1.5	3.0	2.2	71	72	84	76
12 HY466	5548	4225	4150	4641	20	2	20	19	105	104	93	100	1.0	1.7	1.3	71	72	87	77
13 HY528	6872	3985	4665	5174	4	6	13	5	107	104	91	101	1.6	3.3	2.4	76	75	88	80
14 HY529	5329	3806	3951	4362	23	7	22	22	107	104	94	101	2.0	2.0	2.0	79	75	90	81
15 HY644	6030	3101	5424	4852	16	24	4	14	108	103	89	100	1.0	4.0	2.5	76	70	87	76
16 HY660	6311	3132	4592	4678	12	23	16	17	105	103	84	97	1.0	4.7	2.8	76	72	86	78
17 HY651	6081	3803	6011	5298	15	9	3	3	110	104	92	102	1.1	4.0	2.5	75	69	84	76
18 HY652	6632	3038	4430	4867	8	25	19	18	108	104	89	100	1.0	4.0	2.5	74	67	82	75
19 HY653	5385	3557	3539	4160	21	15	23	23	107	104	91	101	1.4	2.0	1.7	83	76	83	76
20 HY654	5370	3301	3307	3993	22	22	24	24	108	105	91	101	1.3	1.0	1.1	76	73	90	80
21 HY655	4391	3355	2533	3426	25	20	26	25	108	104	84	102	1.3	1.0	1.1	80	73	92	82
22 HY656	5812	3447	4136	4462	17	18	21	21	110	105	94	103	1.0	1.3	1.2	76	69	84	76
23 HY662	6980	3307	5090	5129	2	21	7	8	105	104	83	99	1.0	5.0	3.9	75	69	83	76
24 HY666	6927	5026	6150	6034	3	1	1	1	107	105	91	101	1.5	3.7	2.6	74	79	91	81
25 HY667	5886	3707	4938	4770	18	12	10	15	104	104	89	99	1.0	3.7	2.3	74	75	86	78
Mean	6116	3884	4682	4827					108	104	90	100	1.2	2.9	2.1	76	72	86	78
LSD	687	819	834	843					1.8	1.2	3.4	2.7	0.8	1.1	2.1	5.5	6.0	3.9	3.5
CV	7.9	15.7	10.8						1.2	0.8	1.8	2.7	33.4	21.8		5.2	5.9	2.8	
# Reps	4	4	3						4	4	2	4	4	4	4	4	4	3	

* Swift Current irrigated test discarded due to half damage.

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High Yielding Wheat Coop 2010

Table 17

Entry	Disposition	Summary of Dryland tests				Leaf	Spot Kochl. ¹	Field	Bunt	Loss Strut	Rating	FHB Kernel Index Characteristics	
		Kg ha ⁻¹	Rank	Maf.	Ht.								
1 BW881		4445	23	110	101	27	8.4	80.5	36.3	0 VR	50	I	60
2 HY395		5049	8	111	90	3.0	8.9	76.6	36.1	45 MRMS	0 R	0 VR	48
3 HY413		5434	2	110	93	3.5	7.8	77.4	40.2	50 MRMS	T R	3 VR	52
4 HY417		4810	13	112	87	2.7	8.8	78.0	35.7	35 MR	0 R	0 VR	38
5 HY446		4454	22	112	88	2.7	8.8	77.9	35.9	60 MRMS	T R	3 VR	
6 HY459		6327	3	112	93	3.6	7.3	78.1	38.2	25 MRMS	0 R	2 VR	54
7 HY481		4702	20	111	84	2.7	10.2	77.2	36.4	18 MR	0 R	0 VR	57
8 HY462		5127	6	113	79	2.1	6.5	79.4	39.2	T T	T R	3 VR	58
9 HY463		4917	9	112	79	2.3	7.0	78.9	38.9	15 MR	T R	1 VR	53
10 HY464		4801	14	110	82	3.2	8.9	77.1	39.1	45 MRMS	T R	15 MR	70
11 HY465		4721	18	109	86	3.1	8.1	78.6	38.3	70 S	0 R	27 MS	75
12 HY466		4851	11	112	84	1.9	7.6	78.7	41.9	6 MR	T R	24 I	42
13 HY528		5113	7	112	92	3.0	7.3	76.9	38.6	6 MR	0 R	0 VR	36
14 HY529		4819	12	113	95	3.8	8.1	78.5	39.1	T T	0 R	0 VR	30
15 HY644		4986	10	113	91	3.7	7.9	78.5	36.9	35 MRMS	T R	49 S	3
16 HY650		4732	17	111	89	3.6	8.0	81.0	38.0	45 MRMS	0 R	0 VR	20
17 HY651		4711	19	113	86	2.8	7.8	78.6	38.7	20 MR	0 R	5 VR	27
18 HY652		4779	15	111	85	2.8	8.4	76.9	36.6	T T	0 R	1 VR	68
19 HY653		4778	16	113	95	2.9	8.2	79.2	42.5	5 MR	0 R	0 VR	56
20 HY654		4375	24	113	82	2.4	7.3	79.4	41.2	5 MR	0 R	1 VR	68
												0 VR	0
21 HY655		4348	25	113	94	2.9	7.6	79.2	38.9	10 MR	0 R	0 VR	51
22 HY656		4535	21	114	91	2.1	7.7	78.7	35.8	20 MRMS	0 R	0 VR	41
23 HY662		5182	5	111	88	3.3	7.3	78.3	38.4	T T	0 R	24 I	34
24 HY668		5518	1	114	84	3.6	7.9	77.8	38.8	16 RMRR	0 R	30 MS	5
25 HY687		5208	4	111	90	3.2	7.3	78.3	35.0	16 MR	0 R	20 I	54
		Mean	4865	112	89.0	2.8	8.0	78.4	38.2				56
		LSD	310	3.4	1.8	0.8	0.9	3.7	13.8				
		CV							2.1				

¹ The stem rust field reaction data is very poor this year due to extremely low infection and may not be very reliable compared to previous year's rust data.

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200500305

Minutes

Disease Evaluation Team of the Wheat, Rye and Triticale Subcommittee

February 25-27, 2001

Delta Bessborough, Saskatoon

<u>Members</u>	<u>Coop Data Responsibility</u>	<u>Disease Report</u>	<u>Attendance</u>
Bob Conner	SWS Diseases	Soft White Spring Wheat	Present
Myriam Fernandez ²	Leaf spots (tan spot)	WBWC, Triticale, Rye	Present
Tom Fetch	Stem rust		Present
Denis Gaudet	Common bunt	Winter wheat	Present
Jeannie Gilbert ¹	Leaf spots (Septoria), FHB	CBWC	Present
Julie Gold	Spot blotch		Present
Steve Haber		DC	Present
Brent McCallum	Leaf rust	Parkland, Extra Strong	Present
Geoff Hughes	Rust (winter wheat)		Present
Ron Knox		HYWC	Present
Jim Menzies	Loose smut		Present
Byron Puchalski			Present
Hai Su			Present
Andy Tekauz			Present
Kelly Turkington			Present
Tim Xing			Present
Zhuping Yang			Present

¹ Chair

² Secretary

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AGENDA

Disease Evaluation Team of the Wheat, Rye and Triticale Subcommittee

February 25-27, 2001
Delta Bessborough, Saskatoon

Sunday, 25 February, 2001, 3:30 p.m. Location: Kelsey Room

- 1.0 Approval of agenda
Introductions
 - 2.0 Approval of 2000 minutes
Business arising
 - 3.0 Voting procedures
Roll call of members
 - 4.0 Disposition of second and first year coop entries

2.1 CBW	Gilbert
2.2 WBW	Fernandez
2.3 Durum	Haber
2.4 CWES	McCallum
2.5 HYW	Knox
2.6 PWC	McCallum
2.7 SWS	Conner
2.8 WW	Gaudet
2.9 Triticale	Fernandez

- 5.0 Website for Coop disease data.
 - 6.0 Co-op disease screening and evaluation: Private Registration Trials
Spelt (Hucl)
Round-up Ready Wheat (Monsanto/AAFC) Gilbert
 - 7.0 Disease guidelines Fernandez
Amendments: Triticale
 - 8.0 Adjourn

Monday, 26 February, 2001, 3:30 p.m. Location: Kelsey Room

1.0 Voting procedures

Roll call of members

2.0 Consideration of entries eligible for registration:

Wheat	CBW	BW243 BW256 BW259	Gilbert
	WBW	BW754 BW755	Fernandez
	CWES	ES21	McCallum
	HYW	HY644 HY962	Knox
	Winter	W337 S96-33 UM5089	Gaudet
Spelt Spring	CDC Bavaria	Fernandez	

3.0 Nominations for new chair and secretary

4.0 Review of membership

Additions/Deletions

5.0 Adjourn

Sunday, 25 February, 2001.

1.0 Agenda was approved. Motion by Gold/McCallum - carried.

2.0 Minutes from 2000 were approved. Motion by Menzies/Haber - carried.

4.0 Disposition of second and first year entries:

CBW-Gilbert, WBW- Fernandez, CWAD-Haber, CWES-McCallum, HYC-Knox, Parkland-McCallum, WWW-Gaudet, CWW-Gaudet, Triticale-Fernandez. Motion to approve disposition of first and second year entries by Gilbert/Gold - carried.

5.0 Website for co-op disease data:

A website for co-op disease data has been put in place at CRC with Kevin Morgan in charge. It is organized by disease and only available to AAFC employees. In principle, the data would be kept for three years. It was suggested that data from the checks be kept for more than three years. There was also discussion as to whether disease reports could be also placed in this website. It was suggested that co-op coordinators be informed of the existence of this website.

6.0 Private registration trials:

There was discussion about the two private co-ops being proposed, for spelt wheat and Roundup-Ready wheat. There was discussion regarding guidelines for private testing, and the high cost of conducting disease tests on the Roundup-Ready wheat entries. A comment was made that genetically-engineered plants might have a higher disease susceptibility. Moved by Gold/Fetch that the coordinators of such co-ops send the disease protocols to the DET for approval - carried.

7.0 Disease guidelines:

Moved by Gaudet/Menzies that minimum required resistance ("do not object") be changed from R to MR for the following diseases: leaf rust, stem rust and common bunt in the durum co-op; stripe rust in the soft white wheat co-op - carried.

Moved by Fernandez/Gilbert that disease guidelines for triticale include common bunt (R as target resistance and I as minimum required resistance) and FHB (MR as target resistance, MS as minimum required resistance for the eastern, and S for the western, Prairies); and that any level of resistance to FHB should include DON testing - carried. It was also suggested that breeders send their first year entries every year to Gaudet/Puchalski for bunt testing.

There was discussion regarding diseases that are "NA" in the winter wheat and soft white wheat co-ops. Consideration should be given to changing these to priority 2. The usefulness of having guidelines for eastern and western Prairies for some of these diseases was also discussed. Tom Fetch will review these guidelines and come up with a recommendation for revision in 2002.

Adjourned. Gilbert/Fernandez.

Monday, 26 February, 2001.

1.0 Meeting was called to order.

Business arising from Sunday meeting:

Bob Conner presented disposition of first and second year entries of soft white wheat co-op. Moved by Gaudet/Menzies to accept recommendations as amended - carried.

Tom Fetch and Brent McCallum distributed leaf and stem rust seedling infection responses of co-op wheat entries for 2000.

2.0 Consideration of entries eligible for registration:

Candidate cultivars were considered using recommendations made from the disease reports. Changes to recommendations as a result of discussion were noted and amended disease reports are attached to these minutes. The lines considered are as follows:

BW243 Support 0, No objection 0, Objection 17, Abstentions 0, Eligible votes 17.
Leaf Rust MR, Stem Rust R, Common bunt I, Loose smut I, FHB I, Leaf spots

- MS.
 Note: This entry does not have adequate resistance to loose smut.
- BW256 Support 0, No objection 0, Objection 17, Abstentions 0, Eligible votes 17.
 Leaf Rust MR, Stem Rust R, Common bunt I, Loose smut I, FHB I, Leaf spots MS.
 Note: This entry does not have adequate resistance to loose smut.
- BW259 Support 0, No objection 0, Objection 17, Abstentions 0, Eligible votes 17.
 Leaf Rust MR, Stem Rust R, Common bunt S, Loose smut MR, FHB S, Leaf spots MS.
 Note: This entry does not have adequate resistance to common bunt and FHB.
- BW754 Support 0, No objection 5, Objection 11, Abstentions 1, Eligible votes 17.
 Leaf Rust MR, Stem Rust R, Common bunt I, Loose smut I, FHB I, Leaf spots MS.
 Note: This entry does not have adequate resistance to loose smut but it is equal to AC Barrie in reaction to FHB, which is a level above the minimum requirement for this co-op test.
- BW755 Support 0, No objection 5, Objection 12, Abstentions 0, Eligible votes 17.
 Leaf Rust MR Stem Rust R, Common bunt MR, Loose smut I, FHB MS, Leaf spots MS.
 Note: This entry does not have adequate resistance to loose smut.
- ES21 Support 15, No objection 2, Objection 0, Abstentions 0, Eligible votes 17.
 Leaf Rust R, Stem Rust R, Common bunt R, Loose smut R, FHB I, Leaf spots MS.
 Note: This entry has the minimum required resistance to all diseases.
- HY644
 (interim) Support 9, No objection 7, Objection 1, Abstentions 0, Eligible votes 17.
 Leaf Rust MS, Stem Rust MS, Common bunt S, Loose smut ~~R~~^S, FHB R, Leaf spots MS.
 Note: The clause "Use of discretion" in the Operating Procedures of the PRRCG to temporarily disregard the approved disease guidelines for this class was invoked. Supplementary data provided by breeders were accepted.
 This entry is susceptible to most diseases but it is resistant to FHB and DON accumulation, which is a significant improvement for wheat.
- HY962 Support 0, No objection 16, Objection 1, Abstentions 0, Eligible votes 17.
 Leaf Rust R, Stem Rust R, Common bunt MS, Loose smut I, FHB MS, Leaf spots MS.
 Note: Supplementary data provided by breeders were accepted. This entry does not have adequate resistance to common bunt, but its leaf and stem rust and loose smut resistance are an improvement for this class.

- W337 Support 5, No objection 9, Objection 2, Abstentions 0, Eligible votes 16.
Leaf Rust MS, Stem Rust S, Common bunt S, Mite vector of wheat streak mosaic virus R.
Note: The clause "Use of discretion" in the Operating Procedures of the PRRCG to temporarily disregard the approved disease guidelines for this class was invoked. This entry does not have adequate resistance to leaf and stem rust and common bunt but it is the first winter wheat candidate with resistance to the mite vector of the wheat streak mosaic virus.
- S96-33 Support 0, No objection 11, Objection 4, Abstentions 0, Eligible votes 15.
Leaf Rust I, Stem Rust I.
Note: This entry has an intermediate reaction to leaf and stem rust which is an improvement for this class. It was not tested for reaction to common bunt.
- UM5089 Support 10, No objection 3, Objection 2, Abstentions 0, Eligible votes 15.
Leaf Rust R, Stem Rust R.
Note: This entry represents an improvement in leaf and stem rust reaction for this class. It was not tested for reaction to common bunt.
- CDC Bavaria Support 0, No objection 0, Objection 0, Abstentions 16, Eligible votes 16.
Note: There are no disease guidelines for spelt wheat and no protocol for the testing done was submitted.

6.0 Review of membership:

Francois Eudes was nominated as member of the WRT Disease Evaluation Team, and Bob Conner was deleted. Gilbert/Menzies-carried

Adjourned. Menzies/Gold.



200500305

United States
Department of
Agriculture

Marketing and
Regulatory
Programs

Agricultural
Marketing
Service

Livestock and
Seed Program

Seed Regulatory &
Testing Branch
NAL Rm. 400
10301 Baltimore
Blvd.
Beltsville, Maryland
20705-2351

Phone:
301-504-5682

FAX:
301-504-5291

E-mail:
Al.burgoon@usda.gov

Web Site:
[www.ams.usda.gov
/lsg/seed.htm](http://www.ams.usda.gov/lsg/seed.htm)

June 1, 2005

Mr. Ron Weik
Quality Assured Seeds, Inc.
418B McDonald Street
Regina, SK S4N 6E1
Canada

Dear Mr. Weik:

In response to your inquiry concerning variety names, we have checked our own database, the UPOV-ROM database and the EEC Common Catalog and found the following:

Names Cleared: 'HY644' for common wheat. Note: the term 'HY' invokes the notion of hybrid in my mind, which may be misleading for a wheat variety. This name was published in 2001.

We are no longer doing Trademark searches on proposed variety names. The Trademark database can be accessed via the Internet at the following web site: "tess2.uspto.gov". Because there is no variety registration system, we cannot assure you that these names are free of conflicts. Moreover, our clearance confers no legal precedence.

We are happy to help you in this matter. **Please inform us about your new variety releases, including the kind, release date, and experimental designation(s) of the new varieties. Also, please indicate which names you decline to use so that they may be returned to the pool of available names.**

Thank you.

Sincerely,

Al Burgoon
Horticulturist
Testing Section

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Mr. Ron Weik

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AMS:LS:SRTB:TS:ABURGOON:6/1/05;VNCLATTERTEMPLATE5.DOT.doc

4. Summary of Analytical Wheat and Flour Data for HY644

The HYW# for 'HY644' = 644R

MH

5-10-2006

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SUMMARY OF GRL ASSESSMENT OF STRENGTHS AND WEAKNESSES RELATIVE TO CRYSTAL, KAHMA, AND VISTA (K. PRESTON, H. MORGAN, F. LYSENKO).

YEAR IN IN TEST	PERFORM. IN TEST	EXCELLENT (CONSIDERABLY BETTER THAN CHECKS)	VERY GOOD (SUPERIOR TO CHECKS)	RATHER UNSATISFACTORY (INFERIOR TO CHECKS)	POOR (CONSIDERABLY POORER THAN CHECKS)	TEMPORARY ASSESS.
446W 4	2000	FCol	Fabs	KWI Rabs	FYld	
1998		RIV	Fabs Rabs		FYld	
1998		Fash Fabs	WFro FPlo		FYld	
1997			RIV	Fash	FYld	
453W 2	2000	Fash	Ampl FCol	WFro FPlo RCCal Rabs	FYld	
1999		Fash	Fabs RIV Rabs	FYld FCol		
454W 1	2000	FCol	Fash RIV Tex	TWR FPl Amvl	WFro Fabs Rabs	
529W 1	2000	FCol	FYld Fash RIV	TWR FPl Amvl	WFro FPl Fabs Rabs	
539W 1	2000	FYld FGch	Fash RIV	WFro FPlo	FN Amvl Fabs Rabs	
967W 1	2000	FYld	FCol Tex	KWI FYld Fabs	TWR Rabs	
644R 3	2000		WFro FPl Fabs	RCCal Rabs Weak	Amvl FCol RIV	
1999		Fabs		Amvl RIV RDCol	FCol	
1998		Fabs	WFro FN Fash	Amvl FPl RIV		
867R 3	2000	WFro FPlo RIV Rabs	FYld FCol			
1999		WFro FPlo RIV	FN Fash	TWR		
1998		Fash FCol RIV	WFro FPl Amvl Rabs			
462R 1	2000		WFro FPlo FYld Rabs	Amvl FCol Weak		
463R 1	2000		WFro FYld	Weak		
652R 1	2000		WFro FPl Fabs	TWR Weak		
633R 1	2000	FYld	WFro FPl Fash	KWI Hand Weak		
966W 1	2000	Fabs	FYld Rabs	KWI Amvl Fash Hand Weak		

* These lines do not meet the KVD requirements for the CPS class.

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2000 HIGH YIELD WHEATS

WHEAT AND FLOUR DATA -- ANALYTICAL

VARIETY	HYW#	YEARS IN TEST	YEAR	GRADE	TEST WT	KER WT	WHT PRO	PRO LOSS	FALL#	AMYL.			SD	MEG	PSI
										BU	FL YLD	FLASH AG COL			
Barrie	BW661	CHK	2000	1CWRS	82.6	34.3	14.5	13.9	0.6	415	810	76.8	0.44	81	6.1
Karma	395-W	CHK	2000	1 CPSW	81.9	36.2	12.2	11.2	1.0	370	695	77.1	0.46	86	5.8
Vista	413-W	CHK	2000	1 CPSW	81.7	40.8	12.7	11.6	1.1	385	725	75.8	0.47	77	8.0
Crystal	417-R	CHK	2000	1 CPSR	81.6	35.8	11.9	11.1	0.8	385	860	75.4	0.44	77	5.9
*446-W	4	2000	CWFEED	81.7	35.1	12.6	11.6	1.0	390	710	75.5	0.46	81	6.5	
644-R	3	2000	1 CPSR	81.6	37.3	12.4	11.7	0.7	400	550	77.1	0.46	64	7.5	
962-R	3	2000	1 CPSR	81.2	40.3	13.2	12.4	0.8	385	915	76.4	0.42	80	6.1	
459-W	2	2000	1 CPSW	82.6	39.0	11.9	10.8	1.1	355	935	75.9	0.41	81	6.2	
462-R	1	2000	1 CPSR	82.3	40.5	12.6	11.8	0.8	350	630	76.2	0.45	73	5.7	
463-R	1	2000	1 CPSR	82.0	40.2	12.3	11.4	0.9	380	790	76.2	0.45	77	6.1	
464-W	1	2000	1 CPSW	80.7	39.2	11.6	10.7	0.9	360	495	76.1	0.43	83	6.5	
528-W	1	2000	1 CPSW	80.6	39.1	11.3	10.5	0.8	310	510	77.1	0.42	85	6.0	
529-W	1	2000	1 CPSW	82.1	39.6	12.0	11.1	0.9	295	310	78.0	0.44	83	5.5	
652-R	1	2000	1 CPSR	80.3	38.9	12.6	11.6	1.0	415	800	76.0	0.43	77	6.0	
653-R	1	2000	1 CPSR	82.4	43.9	12.6	11.7	0.9	400	800	77.5	0.41	76	5.9	
966-W	1	2000	1 CPSW	81.3	41.4	12.1	11.2	0.9	375	670	77.0	0.47	75	8.6	
967-W	1	2000	1 CPSW	79.7	37.1	12.5	11.6	0.9	410	740	74.3	0.46	80	5.7	

Composite grades were based on visual inspection with focus on subjective factors evaluated.

Test line 966 was shown as a CPS-R on the pedigree sheet, however it is a CPS-W.

2000 HIGH YIELD WHEATS

WHEAT AND FLOUR DATA -- ANALYTICAL										WHEAT AND FLOUR DATA -- ANALYTICAL																							
DIFFERENCE FROM CRYSTAL		YEARS IN TEST	YEAR	GRADE	TEST WT	KER WT	WHT PRO	PRO LOSS	FALL#	AMYL BU	FL YLD	FLASH	AG COL	SD MEG	PSI	DIFFERENCE FROM VISTA		YEARS IN TEST	YEAR	GRADE	TEST WT	KER WT	WHT PRO	PRO LOSS	FALL#	AMYL BU	FL YLD	FLASH	AG COL	SD MEG	PSI		
Crystal	417-R	CHK	2000	1 CPSR	0.0	0	0	0.0	0	0.00	0	0	0.00	0	0	644-R	3	2000	1 CPSR	0.0	1.5	0.5	-0.1	15	-310	1.7	0.02	-13	1.6	-3			
	644-R	3	2000	1 CPSR	0.0	0.0	0.5	0.6	0.1							962-R	3	2000	1 CPSR	-0.4	4.5	1.3	0.0	0	56	1.0	-0.02	4	0.2	0			
	962-R	3	2000	1 CPSR	0.0	-0.4	4.5									462-R	1	2000	1 CPSR	0.7	4.7	0.7	0.0	-35	-230	0.8	0.01	-4	-0.2	2			
	462-R	1	2000	1 CPSR	0.7											463-R	1	2000	1 CPSR	0.4	4.4	0.4	0.3	0.1	-5	-70	0.8	0.01	1	0.2	-2		
	463-R	1	2000	1 CPSR	0.4											652-R	1	2000	1 CPSR	-1.3	3.1	0.7	0.5	0.2	30	-60	0.6	-0.01	0	0.1	0		
	652-R	1	2000	1 CPSR	0.8											653-R	1	2000	1 CPSR	0.8	8.1	0.7	0.6	0.1	15	-60	2.1	-0.03	-1	0.0	-8		
	653-R	1	2000	1 CPSR	-0.3	5.6	0.2	0.1	0.1							966-W	1	2000	1 CPSW	0.4	-2.0	-3.7	-0.2	-0.2	-10	-190	1.6	0.03	-2	2.7	-8		
	966-W	1	2000	1 CPSW	-0.3	5.6	0.2	0.1	0.1																								
WHEAT AND FLOUR DATA -- ANALYTICAL										WHEAT AND FLOUR DATA -- ANALYTICAL																							
Karma	395-W	CHK	2000	1 CPSW	0.2	-4.6	-0.5	-0.4	-0.1	-15	-30	1.3	-0.01	9	-2.2	7	Vista	413-W	CHK	2000	1 CPSW	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0
	413-W																*446-W	4	2000	CW FEED	0.0	-5.7	-0.1	0.0	-0.1	5	-15	-0.3	-0.01	5	-1.5	4	
	446-W	4	2000	CW FEED	0.0											459-W	2	2000	1 CPSW	0.9	-1.8	-0.8	0.0	-30	210	0.1	-0.06	4	-1.8	6			
	459-W	2	2000	1 CPSW	0.9											464-W	1	2000	1 CPSW	-1.0	-1.6	-1.1	-0.9	-0.2	-25	-230	0.3	-0.04	7	-1.5	3		
	464-W	1	2000	1 CPSW	-1.1											528-W	1	2000	1 CPSW	-1.1	-1.7	-1.4	-1.1	-0.3	-75	-215	1.3	-0.05	9	-2.0	6		
	528-W	1	2000	1 CPSW	0.4	-1.2	-0.7	-0.5	-0.2							529-W	1	2000	1 CPSW	-2.0	-3.7	-0.2	0.0	-0.2	25	15	-1.5	-0.01	4	-2.3	5		
	529-W	1	2000	1 CPSW	-2.0											967-W	1	2000	1 CPSW	-2.0													

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Difference values for I-tetragraph Absorption for white lines were based on AC Barrie in 2000. For CPS-W, Karma used as standard for Koop and Eng.

2000 HIGH YIELD WHEATS

VARIETY	HY/W#	FARNOGRAPH				REMX TO PEAK				WH/R/K				
		YEARS IN TEST	YEAR	ABS	DDT	MTI	STAB	LV	APP	CSTR	CCOL	ABS	G	MIN
Barrie	BW661	CHK	2000	63.5	6.00	25	10.00	930	8.5	5.5	5.8	66	2.8	2.8
Karma	395-W	CHK	2000	60.9	2.75	70	2.50	720	8.0	5.5	5.8	55	1.1	1.5
Vista	413-W	CHK	2000	68.0	4.50	50	5.00	760	7.6	5.8	5.8	64	2.2	2.4
Crystal	417-R	CHK	2000	60.3	5.50	45	6.00	790	8.2	5.8	5.9	59	2.2	2.3
	*446-W	4	2000	63.4	4.75	45	5.50	780	8.5	5.7	5.8	61	1.6	2.0
	644-R	3	2000	62.3	4.00	40	5.50	670	7.1	5.3	5.3	56	1.5	1.9
	962-R	3	2000	61.5	3.00	20	11.50	940	8.8	6.2	6.1	63	2.4	2.6
	459-W	2	2000	63.0	4.25	50	5.00	745	8.2	5.3	5.0	62	2.2	2.3
	462-R	1	2000	61.7	4.00	55	4.50	800	8.2	5.8	5.9	61	1.8	1.9
	463-R	1	2000	61.6	3.75	60	4.00	790	8.0	5.9	5.9	60	1.7	1.8
	464-W	1	2000	60.5	6.25	45	8.50	820	8.8	6.0	6.3	60	2.6	2.4
	528-W	1	2000	59.5	4.75	55	5.50	810	8.5	5.7	5.9	58	2.2	2.4
	529-W	1	2000	59.2	4.75	50	6.00	805	8.3	5.7	6.0	58	1.8	2.1
	652-R	1	2000	62.2	3.75	50	4.00	750	7.2	5.5	5.5	59	1.8	1.8
	653-R	1	2000	61.3	4.25	50	5.00	775	8.2	5.8	5.8	59	1.8	1.9
	966-W	1	2000	67.5	4.25	50	5.00	760	8.0	5.5	5.7	61	1.6	1.9
	967-W	1	2000	62.0	5.50	45	7.00	770	8.0	5.8	5.9	60	1.7	1.9

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2000 HIGH YIELD WHEATS

DIFFERENCE FROM CRYSTAL				FARINOGRAPH				REMX TO PEAK				WHIRK			
VARIETY	HTW#	YEARS IN TEST	YEAR	ABS	DDT	MTI	STAB	LV	APP	CSTR	CCOL	ABS	G	MIN	
Crystal	417-R	CHK	2000	0.0	0.00	0	0.00	0	0.0	0.0	0.0	0	0.0	0.0	
	644-R	CHK	2000	2.0	-1.50	-5	-0.50	-120	-1.1	-0.5	-0.6	-3	-0.7	-0.4	
	962-R	CHK	2000	1.2	2.50	-25	5.50	150	0.6	0.4	0.2	4	0.2	0.3	
	462-R	CHK	2000	1.4	-1.50	10	-1.50	10	0.0	0.0	0.0	2	-0.4	-0.4	
	468-R	CHK	2000	1.3	-1.75	15	-2.00	0	-0.2	0.1	0.0	1	-0.5	-0.5	
	652-R	CHK	2000	1.9	-1.75	5	-2.00	-40	-1.0	-0.3	-0.4	0	-0.4	-0.5	
	653-R	CHK	2000	1.0	-1.25	5	-1.00	-15	0.0	0.0	-0.1	0	-0.4	-0.4	
	966-W	CHK	2000	7.2	-1.25	5	-1.00	-30	-0.2	-0.3	-0.2	2	-0.6	-0.4	
DIFFERENCE FROM VISTA				FARINOGRAPH				REMX TO PEAK				WHIRK			
VARIETY	HTW#	YEARS IN TEST	YEAR	ABS	DDT	MTI	STAB	LV	APP	CSTR	CCOL	ABS	G	MIN	
Barrie	BW661	CHK	2000	0.0	1.50	-25	5.00	170	0.9	-0.3	0.0	2	0.6	0.4	
Karma	395-W	CHK	2000	-2.6	-1.75	20	-2.50	-40	0.4	-0.3	0.0	-9	-1.1	-0.9	
Vista	413-W	CHK	2000	4.5	0.00	0	0.00	0	0.0	0.0	0.0	0	0.0	0.0	
	*446-W	CHK	2000	-0.1	0.25	5	0.50	20	0.9	-0.1	0.0	-3	-0.6	-0.4	
	459-W	CHK	2000	-0.5	-0.25	0	0.00	-15	0.6	-0.5	-0.8	-2	0.0	-0.1	
	464-W	CHK	2000	-3.0	1.75	-5	3.50	60	1.2	0.2	0.5	-4	0.4	0.0	
	528-W	CHK	2000	-4.0	0.25	5	0.50	50	0.9	-0.1	0.1	-6	0.0	0.0	
	529-W	CHK	2000	-4.3	0.25	0	1.00	45	0.7	-0.1	0.2	-6	-0.4	-0.3	
	967-W	CHK	2000	-1.5	1.00	-5	2.00	10	0.4	0.0	0.1	-4	-0.5	-0.5	

Difference values for Farinograph Absorption for white lines were based on AC Barrie.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE**EXHIBIT E**
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S) Cereal Research Centre - Agriculture and Agri-Food Canada	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER HY644	3. VARIETY NAME HY644
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) 195 Dafoe Road Winnipeg, MB R3T 2M9	5. TELEPHONE (Include area code) (613) 759-7835	6. FAX (Include area code) (613) 759-7770
7. PVPO NUMBER 200500305		

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain.

 YES NO

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country.
Canada

10. Is the applicant the original owner? YES NO If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

YES NO If no, give name of country
Canada

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

YES NO If no, give name of country
Canada

11. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

- If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
- If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
- If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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